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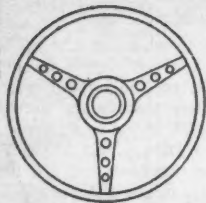
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ROAD & TRACK

THE MOTOR ENTHUSIASTS' MAGAZINE

NOVEMBER 1959, Volume 11, No. 3

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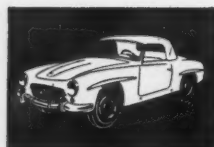
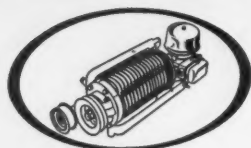
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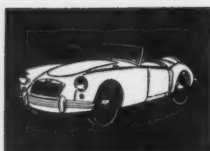
The Chevrolet Corvair—the first U.S. production car to be featured on R&T's cover in over a year and a half, and the first of the new Detroit compacts to be subjected to our test crew. Results of the road test are reported on page 28; a detailed technical analysis is on page 22.

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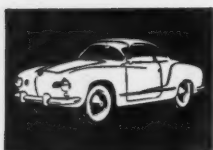
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LETTERS TO THE EDITOR

Misplaced Maserati

With reference to the cover of the August issue, I found a big mistake, which is unpardonable to a respectable magazine like Road & Track.

You state that the Maserati is in the "factory at Maranello," where instead the Ferrari plant is located, 18 km from Modena. The Maserati factory is right in Modena, where Ferrari has offices only. Milano, Italy

Michele Vernola

Top Classic?

All Marmon 16 owners will cheer your Salon report in the July issue, but I suspect that Duesenberg owners may differ with your remark that "we will state without equivocation that the Marmon 16 is the finest and best all-around luxury car on the market today." [See this month's Salon and Classic Test.—Ed.]

If you consider this Marmon 16 to be "America's top classic" you should consider a future story on the top car of all the 16's built. It is a '32 custom-built, 7-passenger touring car owned by one of your subscribers in Pennsylvania. It has had a most interesting history, and has the most handsomely restored engine of



any 16 extant. It is also unique in that one has to lift the hood to find the name Marmon.

While you may not believe it, there is a small group of fans who think very highly of the "miserable" Roosevelt. I'm not a champion of the Roosevelt itself (compared to other Marmon models this was the nadir, to be sure) but I can dig up a score of other even more miserable cars that were "offered to a gullible and unsuspecting public," and usually at prices far in excess of the Roosevelt's \$995. Even the Roosevelt took to the Brickyard and ran up a couple of records in 1929, so it was not exactly a clunker. Newton Centre, Mass. William R. Gibson

R & T Light

Albert Johannsenn Unlimited is a group of college men interested in automotive safety, and particularly lighting. We have done considerable research in the field, and are constantly installing lighting of our own design on European and American cars. The following is our staff's critical commentary on the Road & Track proposals.

The assumption that small but brilliant lights are adequate is unfortunately untrue. A pinpoint of light, no matter how brilliant, is never as attention-getting, as easy to see, as a light with some area. It is our experience that satisfactory tail or signal lights must have at least 3.5 to 4 sq in. of illuminated lens area.

Blue is a good color choice for tail lights. Blue and red lights do the least possible damage to night vision when viewed for long periods and are actually the most restful to the eyes, if not to the nerves of the driver. The Albert Johannsenn lighting standards use red illumination for instruments, with blue indicator lights for this reason.

However, in California, and several other states, blue lights are prohibited on any but emergency vehicles. Now only police motorcycles use blue lights—as tail lights. Clearly California could well change the out-moded rule.

Front signal lights, too, should be amber. Height is not really so critical in front lights, since intervening cars do not block vision seriously as they do on rear lights. Any adequate signal light between 6 in. and 6 ft above the roadway will, in amber color, be seen clearly unless it is too far inboard, or at night too close to headlights (though amber can be quite close without being "drowned"). It must be at the edge of the car, however, and preferably should have two lens faces, one visible to traffic beside the car.

The present system of candlepower ratings for tail-light and signal-light duty is, it seems to us, entirely adequate. Tail lights are now 3 to 4 cp, signals 21 or 32, depending on voltage. With proper lenses and reflectors, these lights perform their functions admirably. Since these are standard sizes, huge inventories of existing lights would not have to be destroyed. Los Angeles, Calif.

Albert Johannsenn
Unlimited

I believe your suggestions as to a 3-light arrangement could be carried a few steps further.

At the top of the 3 lights, use a large red stop signal for maximum visibility, to come on when brake pedal is depressed.

In the center, use a smaller amber light to come on when the driver's foot is off the gas pedal, to indicate that the car is not proceeding under power. The same bulb or a separate bulb in this housing would also flash intermittently when the turn signal is on. (Presumably the car is or will soon be slowing down at this point.)

At the bottom, use a running light the same size as the amber light. It would be blue or green (check with optical and highway authorities on this) and would be on day and night whenever the gas pedal is depressed. When the driver's foot is off the gas pedal, the amber light comes on.

Miami, Fla.

Walter Bode

... How about a standard brilliance for all lights? As things stand, a car with large tail lights looks much closer than a car with small tail lights. . . . Cincinnati, Ohio

Herbert K. Heger

... Has anyone ever seriously mooted the idea of having a brake light mounted ahead, so that oncoming drivers know when a car is slowing down? It would

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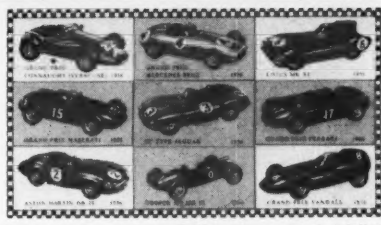


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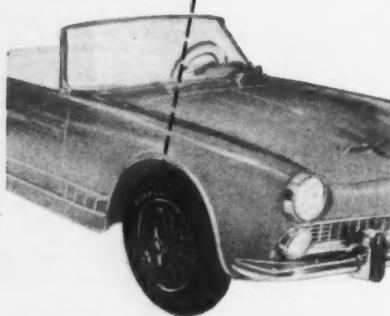
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help total traffic flow if cars in one direction could see that the opposing cars were intending to stop. . . .
Concord, Mass. Robert Brown

. . . The only added requirement would be to make the turn signal relay highly audible. This would prevent driving down the turnpike for 50 miles with one signal blinking. . . .
Lafayette Hill, Pa. Jay W. Howard

In place of blue tail lights, I would like to suggest placing two or more lights so that they would throw a diffused light over a large area of the rear of the car. These lights could be located in the backs of the rear bumper guards, for example; the source of light would not be visible to a following driver, but the illuminated rear of the car would be.

The rear of a Greyhound bus is very visible at night because you can see the whole back end of the bus itself, not just two small red lights somewhere ahead in the dark.
Ventura, Calif. Samuel H. Pinkham

Excellent! (R&T Light, September.) I am afraid, however, that this makes too much sense for universal adoption by the car manufacturers in the foreseeable future. In fact, your idea is so sensible that I am skeptical that it will ever be widely adopted. I hope so very much that I am dead wrong.

Standard and uniform heights of bumpers, identical patterns for automatic transmission dials and other simple ideas, just as sensible, have not made any progress among the fat-heads who design and manufacture the so-called "modern" automobile.
Savannah, Ga. Jack Richards

S.O.S.

In your illustration of the vintage Bentley (August), the Union Jack is depicted upside down. The broad white band in the diagonal cross should be uppermost in the top left-hand corner and not as shown. Flown your way, the flag is used as a signal of distress.

I can only conclude, therefore, that your illustrator must be a disciple of M. Bugatti.

Schefferville, Que. P. J. Godwin

Our illustrator drives a Jaguar, so we don't know where that leaves us.—Ed.

Off and Running

As you know, SCCA recently outlawed the Le Mans-type start. Our annual 6-hour endurance race at Marlboro had always used this start, so this year we devised a compromise which we would like perpetuated as the Marlboro Start.

We placed the cars as if for a Le Mans start, complete with drivers strapped, buckled and ready to go. A pit steward stood several feet behind each car, which was in neutral with switch off and hand brake set. Co-drivers were across the track in the traditional position. At the starter's signal, drivers placed their left hand on top of their helmet and held their right arm outstretched. At the starting signal, the co-drivers ran across the track, passing their car on the driver's right side and touching the driver's right

hand with their right hand. At the contact of hands, the driver could then begin to get ready to go.

With this modification, we preserved the atmosphere and flavor of the Le Mans start, but had the driver secure in his car and the co-driver completely off the track, having continued his run into the infield.

SCCA

Washington, D.C.

Richard N. Hopkins
Regional Executive

Of Interest

Enclosed is a picture of the 4.5 Maserati coupe of Le Mans, 1957, which I



took while passing time at Jim Hall's here in Dallas.

Dallas, Tex.

Donald D. Drake

Only The Best

In regard to your HMS Trials Replica in the September issue, how many readers discovered what a luxuriously equipped test crew you have? In the upper left hand photo on page 45, your test crew is backing away in the last Duesenberg ever built. This particular car is shown on page 87 of J. L. Elbert's book, "Duesenberg, The Mightiest American Motor Car." [And beginning on page 43 in this issue.—Ed.]

Such luxury could lead to a rivalry between test crews of all the other motor magazines that test cars. Which test crew will be first with a new Rolls-Royce, complete with bar, TV and air conditioning? Think how miserable the test crews of economy-car magazines will be made to feel. You have started a trend. Who will win?

Belleville, Ill.

James F. Petrick

Claim to Fame

Re your Late News column (August), the Detroit Drags, even with 750 entries, would still be over 100 short of claiming the "largest racing event in the world." The recent Big Bear Run, a 150-mile hare and hounds chase across Southern California's Mojave Desert, had a starting field of 863 motorcyclists.

Motorcyclist

Pasadena, Calif.

Bill Bagnall

Editor

I Shot an Arrow

Re the Daimler Dart, the old adage, "Give an Englishman a piece of sheet metal and he'll do something silly with it," must now be revised to "Give an Englishman some glass fiber and polyester resin and he'll do something very silly with it."

Los Angeles, Calif.

John O. Braun

National Conspiracy

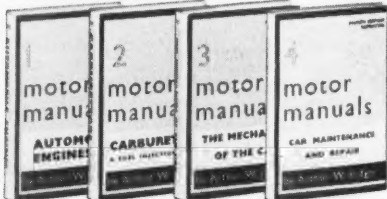
United Press International, Associated Press and local newspapers have given special attention to sports- and imported-car accidents as if the press were involved in a national conspiracy to convince the

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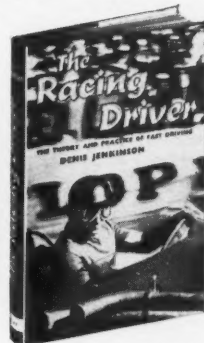
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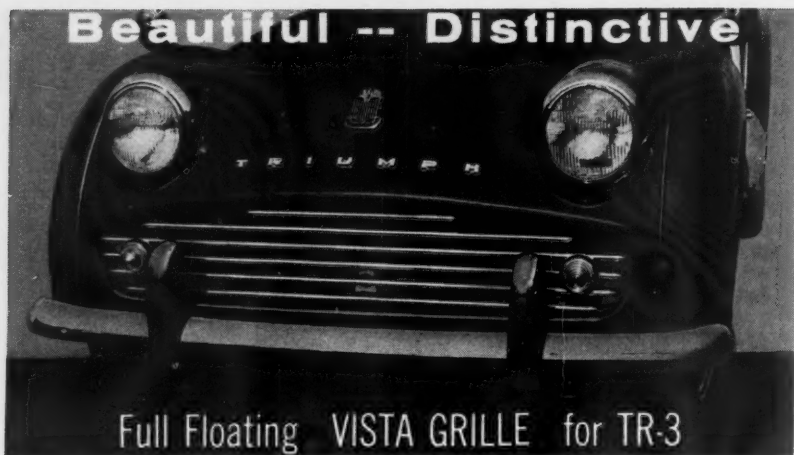
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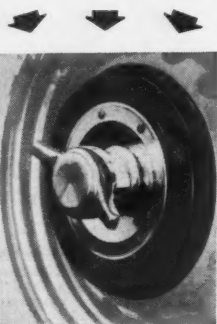
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public that sports and imported cars are less safe than the domestic variety.

I suspect that sports cars and many imports are safer than our domestic products. If this is so, I suggest that it is the responsibility of sports car clubs (and dealers) to furnish the wire services proportional accident statistics as proof. Seaside, Calif. Wayne A. Chesem

French Cyclops

I just bought a good book titled, "The World's Automobiles 1880-1958," written by G. R. Doyle. Under the heading C there is listed a French car, the Cyclope. This is not quite Cyclops, but it is interesting. It was manufactured from 1900 to about 1905 by Daniel Augé et Cie., Levallois, France. A footnote states that it was so named because of its single, centered light (same as the Garford and Briscoe).

New Orleans, La. Robert Chandler

Neglected Delage

I was interested in Smith Hempstone Oliver's article, "Les Voitures de Course Delage," in your August issue, but I am surprised that he has omitted all reference to three other less well known Delage racing models, a 12 and two 6's, constructed between 1922 and 1924. These three cars were intended primarily for sprint racing and hillclimbs and in this sphere were highly successful, winning, among other events, those of La Turbie, Mont Agel, Gaillon, Lafray and the last town-to-town race, the Toul-Nancy.

Brief details of these cars, all of which went to Britain when the Delage racing department was disbanded at the end of 1927, are: 1) 6 cyl, 85 x 150, 5136 cc, pushrod operated, ohv, unsupercharged, maximum speed 120-125 mph; 2) 6 cyl, 95 x 140, 5954 cc, 2 ohc, unsupercharged, maximum speed 125-128 mph. Both had semi-elliptic springing all around and were fitted with narrow 2-seater bodies. They were raced successfully at Brooklands for a number of years.

The third car must rank as one of the most famous Delage cars ever built, second only to the famous 1.5-liter of 1927. It was a 12-cyl, 90 x 140, 10,600 cc, pushrod-operated ohv. Unsupercharged, it gave 280 hp and had a maximum speed of about 150 mph. It was fitted with a narrow 2-seater body later converted to an offset single-seater.

This car held the land speed record for a few days in 1924, and in 1932, with John Cobb driving, it won the British Empire Trophy Race at Brooklands. It could lap Brooklands at 135 mph and kept on winning races there until the outbreak of war in 1939.

Cascais, Portugal T. A. Mathieson

Loud Sing Cuckoo

Allow me to support your "let the chips fall where they may" stand regarding your current road test of the Morgan (September). The editor of the Morgan Plus-Four *Format* has blasted R&T's "trend toward dogma of a kind practiced by junior high school shop majors and used-car salesmen," adding that "the Morgan road test commentary is a travesty of an authentic technical discourse

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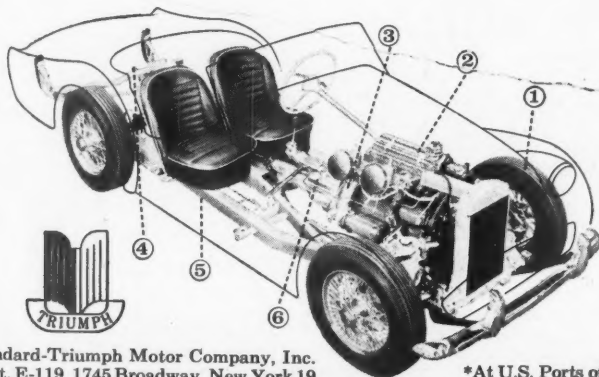
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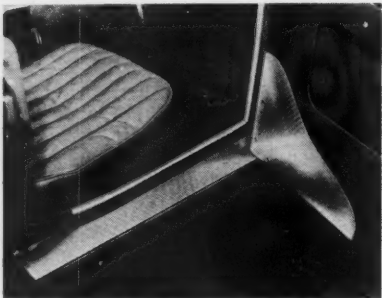


INTIMATE TRUE-LIFE STORY REVEALED by Marion Weber

Every day at the MG Mitten Company we receive several letters asking questions like "Who is the gal in the photo at the top of your ads?" or (addressed to Mr. Marion Weber) . . . "Who is the fellow in the photo?" These questions, unlike queries such as "Where can I get a chromed valve cover for my 1936 Whippet that I am preparing for a Concours?" are difficult to answer. WHO, indeed, is the gal (correct guess) that continues to smile and wave happily from the printed page . . . even if business is lousy. Is she still the same enthusiastic outgoing girl who graduated from Miss Culpepper's Finishing School for Young Ladies in 1933, ready to conquer the Business World? Or, abraded by the trials of enterprise, buffeted by the winds of trade and submerged by the tides of industry, has she suffered a complete personality change, becoming, in effect, a Tycoon? Is the photo Marion Weber, Housewife? Or, Marion G. Mitten, Corporation President? (Interesting, eh?) If there is sufficient demand, we will explore this fascinating psychological study in future columns; meanwhile, everyone is interested in saving so here are some:

MONEY SAVERS

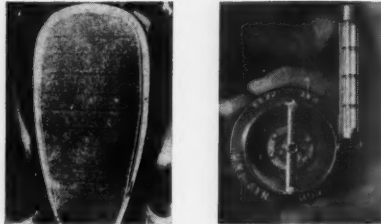
REPLACEMENT TOPS, for example. The thought of having to pay a three-figure price to get a convertible top replaced is enough to stop most anyone . . . but, this is the kind of a quote you get nowadays . . . \$5. We have the answer: do it yourself. Yes, you . . . It's easy with our top kits . . . and the price, \$29.95 is almost unbelievable. Take our word, though . . . these are real quality, satisfaction guaranteed style and all that . . . so if your rag is ragged . . . see our October ad, this mag, or write for FREE CATALOG with all details.



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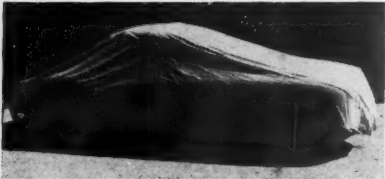


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by a qualified person." The article ends in a strong vein of personal vituperation directed against the technical editor and certain phases of his automotive career.

The test report itself was objective and far more favorable than derogatory in its treatment of the marque. Please continue this trend away from the white-washing blanket bouquets that so many automotive writers heap upon the chariots they are supposed to test. After all, one of the principal objectives of any honest test is to find faults, if any exist.

I am renewing my subscription (lapsed since your unjustified price boost of a couple of years back) to counterbalance C. F. Talbott's (the Morgan editor) who has cancelled his.

I remain a devoted Morgan fan. It's just that high school teachers with five children have to settle for TD's.

Fairfield, Calif. James Berkeley Norris

The complete text of Mr. Talbott's comments is as follows:

"You may have read the September issue of Road & Track magazine. Previous issues of this magazine have, to your editor's way of thinking, evinced a definite trend toward dogma of a kind practiced by junior high school shop majors and used-car salesmen. In short, R&T has made the error of taking themselves seriously and the Morgan road test commentary is a travesty of an authentic technical discourse by a qualified person. It has been brought to this editor's attention that R&T's technical editor is allowed to write as he does by virtue of brief and unsuccessful attempts at racing plus two years of selling VW's. Talbott is cancelling his subscription."

A Time to Speak

WE HAVE JUST READ WITH GREAT HORROR AND DISGUST THE SIMCA AD ON THE BACK COVER OF SEPTEMBER ROAD & TRACK. ALWAYS THOUGHT THAT ROAD & TRACK TOOK GREAT PRIDE IN THE SCREENING OF AD MATERIAL PRINTED. NOW WE FEEL THAT YOUR MAGAZINE FALLS IN THE SAME CATEGORY AS ALL THE REST OF THE CHEAP PULP CAR MAGAZINES. RETURN TO YOUR FORMER POLICY OR LOSE OUR CONFIDENCE IN YOUR INTEGRITY AND GOOD JUDGMENT.

Seattle, Wash.

Pete Lovely
Stephen Bayne
Ed Barney
Ralph Ormsbee

We have always screened and still do screen our advertising for what we know are poor or phony products. We even reject ads for products that are not phony but make fraudulent or extravagant claims in their copy. We do not feel that the Simca ad falls into either category, even though we believe in the old axiom, "never try to sell by knocking your competitor." We feel that your gripe is with the Simca firm if you object to their form of advertising (as we do), since we can hardly prevent your seeing the ad in other large-circulation publications. Also, please note our comments re this ad in October Miscellaneous Ramblings, which had gone to press before we received your wire.

Since at least one of you is a VW dealer, it seems to us that there may be a question of prejudice.—Ed. (continued)

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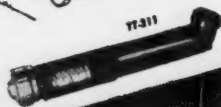
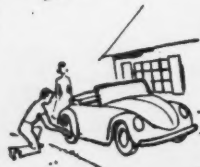
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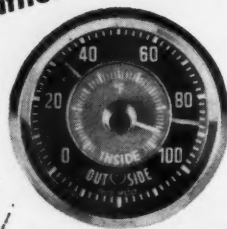
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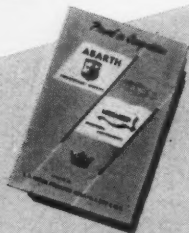
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A-Round the Corner

I was most interested to read Ken Miles's comments on my June letter (Letters, August). While I do not fully agree with some of the details of his discussion, I am quite willing to admit that the maneuver which he describes is not only possible but frequently practiced. I believe I can summarize it as a technique whereby power is applied in a corner and, with the addition of some judicious steering, the vehicle leaves the corner on a larger-radius arc than that on which it entered; the maneuver results in kind of an enlarging spiral.

I only regret that Mr. Miles did not conclude his discussion by enlightening us as to exactly how this technique has helped the car through the corner. Since the vehicle has apparently been successful in negotiating the tightest arc of the spiral, surely it could conclude the maneuver by continuing on the same arc without the application of power; and if there is apparently a surplus of room allowing the driver to drift out to a wider arc, then perhaps the corner could have been entered at a higher speed initially.

I will certainly concede that certain conditions can exist whereby this technique can be invaluable: for example, passing a car on the inside at a curve or perhaps negotiating a curve which is in the form of an opening spiral. However, I do not believe we will clarify the discussion by taking a statement out of context from a generalized treatment and applying it to a special situation. What may be helpful to a driver in one situation may be quite the opposite in another. What we must confine ourselves to here is the particular statements which prompted my original letter. Quoting again from the original article (April 1959), "... When he reached the limit of adhesion he put his foot hard on the throttle in order to prevent losing the tail of the car completely, this action bringing the rear more in line with the front, so that he ended the corner on full throttle with the tail no longer sliding outwards."

Now, if Mr. Miles means his discussion to apply to the above description, then I can only visualize the entire vehicle drifting outward onto a larger arc radius as it negotiates the curve. Surely this is not the impression to be gathered from the original context.

Oak Park, Mich. Jule Brinn

Made to be Broken

On August 8 and 9 I attended the New York Region sports-car races at Montgomery, N.Y., as the guest of one of the drivers. This was the first time I had been in the pits, and although I was thoroughly impressed with the friendliness and spirit of cooperation among the crews in the pits (as well as the skill of the drivers on the track), one incident struck a jangling discord.

About 10:30 Saturday morning, Alfred Momo of the Momo (Briggs Cunningham) Team obtained five inspection stickers from one of the inspection committee and proceeded to affix them to the three Lister-Jags, the RSK Porsche, and the Stanguellini entered by his team. At

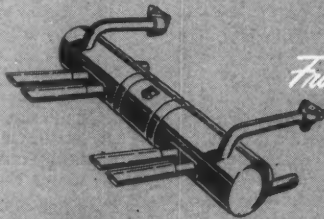
Why the man who owns one proudly recommends



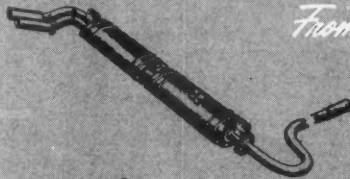
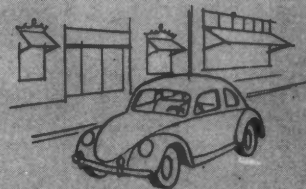
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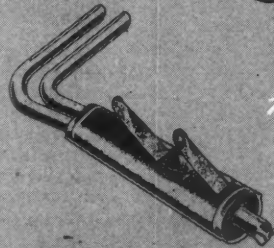
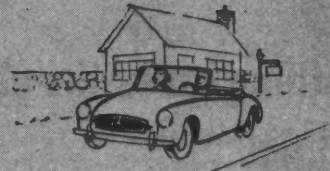
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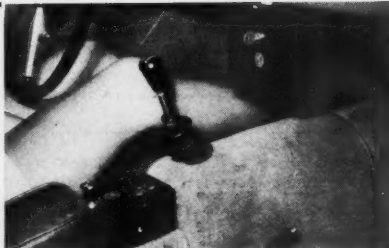
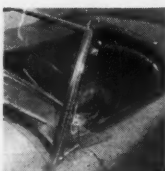
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that time, at least one of the cars was still on its trailer and none of them, to the best of my knowledge, had gone through the braking tests being conducted directly in front of the Momo van.

According to several of the drivers and pit crews with whom I talked, it has been standard procedure at some courses—fortunately not at all—to waive completely the technical inspection of the Momo cars. This is rank discrimination and a flagrant rule violation. Skillful as the Momo mechanics may be, and efficient as the organization may be, human errors can occur. Quite possibly a technical inspection would not have revealed the flaw which caused one of the Lister-Jags to lose a wheel during the race, but the fact remains that the inspection committee was not even given the opportunity to discover it.

The other drivers, as well as the spectators, are entitled to whatever protection a thorough technical inspection can provide. The "assumption of risk" doctrine normally applies to sporting events voluntarily attended. However, disregard for rules such as this, designed to promote safety, would almost certainly impose a legal liability upon the race sponsors and officials for any injuries proximately caused by mechanical failures which should have been detected during inspection—all the signed waivers and published disclaimers of liability notwithstanding. With sports-car racing under attack from many quarters, we cannot afford to give the attackers further ammunition.

I think I can anticipate the rationalization behind the preferential treatment afforded the Momo Team. They drive the big machinery. The paying public insists on seeing this type of car run, or they won't attend in sufficient numbers to cover the costs of promoting such a meet. Without these revenues, the little men would have no racing at all. It costs a fortune to campaign three Lister-Jags, a Porsche and a Stanguellini; ergo, Mr. Momo and company are entitled to every consideration. There is one error in this superficially persuasive logic: "every consideration" is not synonymous with "rule breaking." I personally observed the Aston Martin—which went beautifully and reliably to win the Governor's Cup Race—undergoing a most rigorous braking inspection. Similarly, the Team Roosevelt wasn't too big and important to abide by established rules with their Fiats. Why is Mr. Momo?

Lt. Col. Bradley F. Prann
Newburgh, N. Y.

Uber Alles

As a devoted owner of a 1958 Karman-Ghia coupe, I was quite disturbed at what I would consider your misleading comparison of the KG to the new Caravelle in Miscellaneous Ramblings (August).

Of course I haven't seen the new Renault, but judging from your R&T road test in the same issue, the performance is not equal to my KG, just as the Dauphine will not outperform the VW sedan. The Ghia will reach 90 mph on the speedometer on a level road any time it is in good tune. Even though the speed-

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Your car crest is imprinted with remarkable definition and clarity in white. In addition, each “Competition” is packaged in an elegant Swedish presentation case with your car crest imprinted on the cover in 24 karat gold. This unusual box is well suited for use as a cuff-link or small jewelry case. Can you think of a more desirable gift to yourself or anyone owning or admiring fine cars than this distinctive watch?

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ometer is rather optimistic, it certainly isn't more than 10-15% so.

You claim 32.2 to 35.8 mpg with the Caravelle with odometer correction. The overall mileage of my KG at 35,000 miles was 34.7. This is without odometer correction but is still very good. I don't believe there is a production car made that will get mileage comparable to a Karmann-Ghia's at sustained speeds of 75-85 mph. Gas mileage of course isn't the only economy factor. The Caravelle does 15.3 mph for each 1000 rpm in 4th, opposed to the Ghia's 20. The stroke on the Renault is 3.15 compared to VW's 2.5. The VW obviously has the better durability plus unequaled resale value.

Looks, of course, are a matter of personal opinion, as you have stated before. However, you people have always led readers to believe you were from the school of clean, uncluttered lines. That being the case, it seems hard to believe that you could mistakenly refer to the

Caravelle as a better-looking car than the Karmann-Ghia, which has the cleanest, most uncluttered and beautiful lines of any car under \$3000 and of most of them at any price. Of course, that French wine may have cleaned up the Caravelle's lines for you considerably.

If the quality of workmanship and material doesn't compare more favorably than the Dauphine does with the VW sedan, then the KG doesn't have much to worry about from the discriminating customer.

You say the handling qualities of the Caravelle are superior, but what about that 4.5 turns of the steering wheel?

I do not mean to under-rate the Dauphine or the Caravelle because I think they are good cars, and at least the Caravelle is good looking. But they still don't compare with the VW and KG with that wonderful, durable little short-stroke, air-cooled engine.

Forks, Wash. Dick Sutton

COMING EVENTS

REGIONAL AND NATIONAL

- Oct. 10 Fall Meet, Veteran Motor Car Club of America, Hershey, Pa.
- Oct. 10-11 SCCA races, El Paso, Tex.
- Oct. 10-11 Los Angeles Times Sports-Car Grand Prix, Riverside, Calif.
- Oct. 10-11 SCCA Rip Van Winkle Rally, New York**
- Oct. 10-11 SCCA races, Atlanta, Ga.
- Oct. 10-11 SCCA races, Vineland, N.J.
- Oct. 10-11 SCCA races, St. Louis, Mo.
- Oct. 10-11 SCCA races, Midland, Tex.
- Oct. 13-17 American International Rally I to Las Vegas, Nev.**
- Oct. 17 SCCA races, Lime Rock, Conn.
- Oct. 17-18 SCCA South Texas State Fair Rally, San Jacinto**
- Oct. 17-18 SCCA races, Detroit, Mich.
- Oct. 24-25 SCCA races, Laguna Seca, Monterey, Calif.
- Oct. 24-25 Motor Sport Show, Des Moines, Iowa
- Oct. 24-25 SCCA Flaming Fall Rally, Kansas City, Mo.**
- Oct. 25 Hillclimb, Birmingham, Ala.
- Oct. 31- Nov. 1 SCCA races, Vineland, N.J.
- Nov. 1 SCCA races, Independence, Mo.
- Nov. 7-8 SCCA Appalachian Rally, Philadelphia, Pa.**
- Nov. 7-8 SCCA races, Palm Springs, Calif.
- Nov. 7-8 SCCA races, Oklahoma City, Okla.
- Nov. 7-8 Forty-Niner National Rally, San Francisco, Calif.**
- Nov. 7-8 SCCA races, San Diego, Calif.

- Nov. 14-15 SCCA races, Daytona Beach, Fla.
- Nov. 14-15 SCCA races, Marlboro, Md.
- Nov. 14-15 SCCA races, Vaca Valley, Calif.
- Nov. 21-22 SCCA races, Tucson, Ariz.
- Nov. 28-29 SCCA races, New Orleans, La.
- Nov. 28-29 Hillclimb, Chimney Rock, N.C.
- Dec. 5-6 SCCA National Rally, San Francisco, Calif.**
- June 10-26 British Exhibition, Coliseum, New York, N.Y. 1960

INTERNATIONAL EVENTS

- Oct. 9-11 Avus Rally, Germany
- Oct. 12 10-hour race, San Cristobal, Venezuela
- Oct. 18 Formula I & II Championship races, Watkins Glen, N.Y.**
- Oct. 21-31 International Motor Exhibition, London
- Oct. 22-25 Rally of the Auto Club of Portugal**
- Oct. 31- Nov. 11 Torino Auto Show, Italy
- Nov. 8 Venezuelan Grand Prix, Caracas
- Nov. 15 Barre Tijuca sports car races, Brazil
- Nov. 15 Macao Grand Prix, China
- Nov. 16-21 RAC Rally of Great Britain**
- Nov. 28- Dec. 7 Nassau Speed Weeks, Bahamas
- Nov. 29 Grand Prix of Interlagos (sports cars), Brazil
- Nov. 29 Australian Grand Prix
- Dec. 5-6 Kumasi Rally, Ghana
- Dec. 12 Grand Prix of the U.S., Sebring, Fla.**

Dates appear to be firm unless otherwise indicated, but R&T cannot be responsible for changes or cancellations. A local check at the last minute is always advisable. Bold face indicates championship events.

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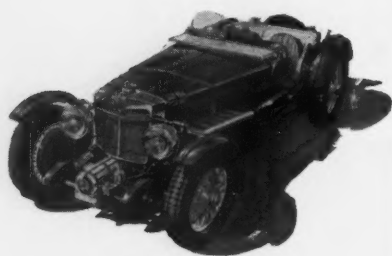
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COLOR PRINTS

A full-color reproduction of the Blower Bentley originally presented in the August '59 issue of Road & Track is now available along with the other two paintings by Toby Nippel of the Ulster Aston Martin, August '58, and the MG K-3 Magnette (shown) from the May '59 issue.

\$1 each or the set of three for \$2.

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LATE NEWS

Rumor Department (Ferrari)

Unconfirmed reports state that Enzo Ferrari would consider offers for his concern if they are made attractive enough. The rumor has, somewhat understandably, been linked with U.S. interests. We doubt that Ferrari is ready to sell but . . . there is a price for anything.

Standard Tractor Sale

The Standard Motor Company, Ltd. sold its tractor manufacturing division to Massey-Ferguson, Ltd. for a reported \$41,720,000. This not only resulted in a considerable increase in cash resources, but will undoubtedly benefit stockholders in the Standard company. Although extensive changes are planned for the current fiscal year, a normal dividend of 9% is expected to be paid and company officials indicated that 12% would be recommended.

Valiant Assembly in Holland

Plans for exporting the U.S. compact cars are going ahead, as expected. The Valiant is to be assembled in Chrysler's plant in Rotterdam.

Jaguar Assembly in Mexico

An initial order for 500 units has been received by Jaguar from the Mexican distributors, Jaguar Automotriz de Mexico. This move is the result of an arrangement made last year between Jaguar Cars, Ltd., and this Mexican distributor for assembly of the cars in Mexico.

New Swedish Car

A new Swedish car, maybe next year. No name has been announced but the firm which will produce it is the Aktiebolaget Nykoping's Automobilfabrik.

Go Kart Quandary in England

Go Karts, the latest racing phenomenon in the U.S., have invaded the British Empire and posed a question in the offices of the Royal Automobile Club. The question is whether they are to be considered motor sport, or not.

Our British contemporary *The Motor*, opines that, "Although there is very wide difference between 500's and go karts, it might possibly become a useful bridge to the newly popular Junior Formula, if not to Formula III. Go karts at the moment are what the 500's were at the beginning, the cheapest kind of racing to ordinary characters."

Rolls Acquires Coachworks

Rolls-Royce, Ltd. recently purchased the firm of H. J. Mulliner, Ltd. of London. Design and construction of special automobile coachwork will continue.

Siata-Abarth Merger

A new company, located in Turin, Italy, was formed by Siata and Abarth and combines the technical resources and engineering facilities of the two organizations. Abarth, as such, will remain independent and the new company will embark on a separate program.

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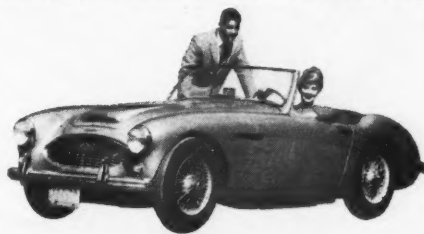
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 BAYPORT..... BAYPORT SPORT CAR CENTER
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 EAST PATERSON..... STEIKER MOTORS
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 ENGLEWOOD.....
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 GLASSBORO..... ED ROTH & SON
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MISCELLANEOUS RAMBLINGS

BY JOHN R. BOND

CHEVROLET's new air-cooled Corvair highlights this issue, and we believe it to be one of the most significant automotive developments in many years.

Unfortunately, the end result of using air cooling and lots of aluminum throughout does not appear to have saved much weight. The complete, ready-to-run Corvair engine weighs 300 lb with no flywheel (as used with the automatic transmission). The flywheel and clutch add 58 lb. The weight of the comparable Ford Falcon water-cooled, cast-iron engine was given to us as 345 lb with flywheel, but no clutch! The clutch weighs about 20 lb, so the air cooling saved only 7 lb. However, the water-cooled engine needs a radiator, connecting hoses and water to be strictly comparable. On the other hand, an aluminum block in the Falcon would save more weight than is required by the external cooling accessories, so it is safe to say that the old theory that an air-cooled engine is always lighter is a myth.

Further proof, if needed, can be found in the Porsche 550 racing engine, which obviously is one of the heaviest 1500-cc engines currently in use for racing. (No exact weight is available, but it must scale over 300 lb.) When you start beefing up an air-cooled engine for the structural rigidity required for high-output per cu in., the engine gets heavy. Also note that if we have two comparable engines, one in line and the other opposed, the latter will usually be the heavier in spite of a shorter and lighter crankshaft.

Dope on DKW

Recently I overheard the following conversation in a New York City bistro. "What does that 3=6 business mean?" Came the ready answer from a bright young fellow, "That simply means that every time the engine turns over 3 times, the wheels revolve 6 times."

The New VW

After their annual summer vacation shutdown, the Volkswagenwerk at Wolfsburg resumed production with several interesting mechanical changes.

We find the Karmann-Ghia-type anti-roll bar now used on all models, up front. VW says this gives still better roadability. The differential is lowered 0.59 in. and the engine/transmission unit now has a 2° forward tilt. This reduces the positive camber at no load (rear wheels) and gives more negative camber than before at full load. The net result of these two changes should give noticeably better handling. Springs are now "softer and more progressive in the upper deflection range," they say. This means that boulevard ride should be improved and that

the variable rate effect has been increased to avoid a complete redesign for more bump travel. Generator capacity has been increased from 160 to 180 watts and defroster efficiency has been improved. Except for minor trim details, including a new steering wheel, there are no other changes, but we certainly believe the suspension alterations will be well worthwhile.

However, a new engine designated "truck" and supplied only in the commercial line has caused a lot of confusion. Here are the facts. Bore and stroke, compression ratio and bhp rating (36) are unchanged, but there are approximately 570 new parts. Most important is a new 3-piece crankcase and new differential housing assembly. Secondly we find a new crankshaft—much heavier, with larger-diameter bearings. There are, of course, new rods and inserts to match. Valves are larger and the camshaft has been changed; these probably account for the specified torque increase of 2 lb-ft to 58 at 2000 rpm.

In addition, the new 3-piece case (a la Porsche) houses a synchromesh first gear and heavier differential gears. All the transmission gears run on needle bearings, by the way. Just the ticket to rejuvenate your tired old '54, you might think. Unfortunately, it's already been tried, and it won't work unless you are prepared to spend about \$300 more for reworking the inside sheet metal.

VW reports that 553,399 automobiles were produced in 1958, compared with 472,554 the year before. The export share was 57.3%. Net profit is reported as over \$76.8 million, or about \$139 per car. Totals for 1959 will undoubtedly be even better, though higher costs may cut down on the profit margin.

The Alma Motor

It's no secret that I graduated from General Motors Institute in Flint, Mich. In August I attended their annual homecoming—my first visit in many, many years. Of course the place has changed tremendously, but the reason I mention all this is that the theme was "Alumni Turning Points." Seven drawings on the printed place mats at lunch illustrated the points. One showed a sports car that looked very much like an MG. Over the picture it said, "Oh, boy, that first sports car." Now we're getting somewhere.

As for GMI, I still think it's the greatest for anyone interested in automotive engineering. It is a co-op type of operation (you must work for GM to get in). GMI emphasizes that the students are employees-in-training, not students getting practical experience. Of over 7000 graduates, 70% have remained with GM; the



DKW's new hardtop carries a crude "American" touch, a clumsy wrap-around.

school provides 25% of the engineers employed by the corporation. The present student body numbers 1950, of which only half are in attendance at any one time. Each student has an alternate so that a job is filled 12 months a year. With six months of schooling per year, it takes five years to get a degree. The waiting list to get in is longer than U.S. Volkswagen dealers' lists.

Oversteer

One of our readers points out that those who say a rear-engined car's oversteer is dangerous should apply full throttle in a curve to any one of our 300-plus-bhp domestic cars—and find out what violent oversteer is really like. Interesting thought, and true.

New Corvette

While in Detroit recently, I had a long talk with Zora Arkus-Duntov, the man most interested in Chevrolet's Corvette. He's quite enthusiastic about the aluminum cylinder heads, a new option for 1960. Compression ratio has been raised to 11.0:1 and this, in conjunction with other changes to improve breathing, boosts the fuel injection version from 290 to 315 bhp. Intake valves are larger—1.94 in. instead of 1.72—and the injection manifold now has a larger plenum chamber over the ram pipes. The heads save 53 lb of weight, bringing the engine total down to about 480 lb without flywheel or clutch. Incidentally these heads are cast of a new material (presumably one of the new extra-high-silicon alloys) and do not use valve seat inserts. Material for the clutch housing has been changed to aluminum also, saving 18 lb. Interesting options will be a new all-aluminum cross-flow radiator and a temperature-modulated, variable-speed fan drive, which limits fan speed to 3100 rpm.

Except for a few minor interior changes, the Corvette's appearance is the same as for 1959. But underneath the car there are some very significant suspension modifications. The more obvious changes are a heavier front anti-roll bar and the addition of a similar bar at the rear, just ahead of the axle. The most significant change is an apparently innocent one: an increase of one in. in rear-spring rebound travel. Zora assures us that this new set-up is extremely effective

and that the new car with standard "soft" suspension will definitely out-handle and out-corner the 1959 heavy-duty option. In fact it's so good that they have discontinued RPO-684, the heavy-duty springs and dampers. There is also a modification in pinion nose angle to give a smoother-operating drive line.

As before, there are two brake options, RPO-686 (sintered-iron linings) and RPO-687 (the ceramic-metallic type). Larger front-wheel cylinders put more power into the front wheels with slightly reduced pedal effort.

The high-performance engines (intended primarily for racing) are given very specialized treatment. In addition to customary inspection, many critical parts are now routed through a special department for a very painstaking examination of dimensions, flaws, finish and quality of materials. Included in this group are valves, rocker arms, pushrods, pistons, connecting rods and crankshafts. Just a few years ago Chevrolet would have laughed at such a suggestion. This certainly shows how serious they are about the sports-car side of the business.

How Many?

The big question re compacts these days is how many will be sold. Industry prognosticators seem to agree on about one million compacts and half a million imports for 1960. We think both figures are low and that the compacts will hurt big car sales. That's what really has the Detroit executives worried.

Caravelle Report

Production of Renault's beautiful new 3-way coupe is finally getting underway, with first deliveries in the U.S. in October. By January 1960, they promise 1000 Caravelles per month, which should be about the right quantity, once the backlog has been reduced.

Just to give our readers an idea of the expense involved in importing cars, Renault, Inc. (U.S.A.) and its distributors and dealers have invested a total of over 50 million dollars in this market, and employ over 8000 persons full time. This doesn't even include the investment made by the factory to increase its production for our market, or the 4-million-dollar advertising budget, which is a new high for an imported car. This, gentlemen, is big

business even in today's economy.

Errata

Some time ago we mentioned a new 750-cc DKW Junior and referred to it as a twin-cylinder on the assumption that the powerplant would be a revival of an earlier unit. This was wrong. The entirely new engine is a 3-cyl in line with bore and stroke equal at 68 mm or 2.677 in. Output is 34 D.I.N. bhp or 39 by the S.A.E. method.

The E-Type

During the past year there have been sly little hints in the British Press about a new Jaguar, the successor to the justly famed "D." One went so far as to imply that all reports published in the U.S. were wrong. They didn't mean us because we haven't said anything. However, the big secret with respect to the coming "E" is that this is much more than a factory racing car: it will, in fact, be a high-production model offered for sale. In effect the new "E" will replace the XK-SS model in their line, a super-sports model for the man who is really serious about sports-car competition. Most reports say it will use the 3.8 engine but we believe this will prove to be wrong. We expect an all-new, light-alloy engine of just under 3 liters. We also expect performance of a caliber sufficient to put Jaguar ahead of the 300-SL's and Corvettes, which means, according to the new "formula," 0-100 and back to 0 in under 25 sec!

Formula I, Domestic

Projects for the construction of American-made Formula I cars are cropping up all over the country. In this issue we have a beautiful color picture of Reventlow's car (page 68) and more details on the following pages. Lance had the car especially painted just for us, by the way.

Another Formula car of near-domestic manufacture was shown last month: Ray Sidel's SSR-1. And, of course, you can always buy a foreign-made machine, which is exactly what a new non-profit organization in Miami, the "Camaradi U.S.A." racing team, has done.

However, we were discussing all-American car projects. For some time Pete Lovely up in Bremerton, Wash., has been hard at work building a Formula I car. This car has been tested and will undoubtedly be an entry at Sebring in December. The engine, by the way, is a 2.5, 4-cyl Ferrari, but at least the chassis is American made.

Prospects for a North American F-I car from Canada are also good—there are some very enthusiastic people up North and they are sure to support this new (to us) development.

Reventlow's crew has its work cut out for it. The new Scarab has brake and suspension problems which will take time to solve. Then there's the new engine to be considered; they haven't run it yet and even with top brains and plenty of money they will be lucky to have the requisite power and durability in less than a year. Incidentally, they have done considerable testing of Italian engines and report that Italian horses are approximately 10% smaller than the rest of the world's.

We understand that Briggs Cunning-

ham has shown considerable interest in the Scarab engine, particularly the 3-liter version. This is certainly encouraging, for this country should support its one and only modern engine in the GP and Sports categories.

Formula I Engines

We have been doing a little preliminary work on the design of a truly competitive 3-liter engine which would be suitable for either the coming Formula "International" or for sports cars. Since piston displacement is fixed at 3 liters, the big question is "how many cylinders?" The Scarab, along with most European GP machinery, has 4 cyl and this seems a very wise choice for a beginning effort.

On the other hand, there is no denying that extra cylinders have advantages. The retired Mercedes cars had 8 cyl, in-line and in their own published reports they admitted that the V-12 looked attractive until the desmodromic valve gear was evolved. Four-cylinder advocates like to point out the advantages of good low-speed torque. This is nonsense on theoretical grounds, but not in actual practice. Engine power and torque are primarily functions of total intake valve area and although engine friction does increase with the number of cylinders, the extra valve area of a V-12 offsets this easily. The only reason a 4 gives such good torque, in practice, is because of the ease of getting near-perfect carburetion for each cylinder. A properly designed V-12, with a carburetor for each cylinder, can give just as much torque as a 4—if it has perfect carburetor calibration. However, if we designed our V-12 for torque equal to a 4, the top end power would be no better than the 4, so why bother with 8 extra cyl?

The reason for bothering with extra cylinders is to get lower piston speeds and bearing loads. Either 6 or 8 cyl should be an acceptable compromise and Ferrari seems to agree. They have tried first a V-12, then a 4, then a V-8, and this year a V-6. We will have more on this subject in a future issue.

Dart Confusion

As is well known, the new Dodge Dart is a 118-in.-wheelbase car, rather similar to the Plymouth, and powered by a new ohv 6. We hear that Daimler will not use the name Dart after all, because Chrysler used the name first on its wedge-shaped dream car.

This reminds us of the confusion over the name Continental, once used simultaneously by Ford, Bentley and Porsche. And we still have trouble with the name Falcon since it was used earlier for a Chrysler dream car. Or, if you want to go back still further, remember the Falcon-Knight produced by Willys-Overland in 1928? That was a pretty good car too, though it had the usual Knight vibration at about 55 mph, and no electric starter known could turn the engine over in zero weather.

Truck I.F.S.

The first American truck to use i.f.s. in production is Chevrolet. They have two new types, one for light-duty and one for heavy-duty, with detail differences dictated by the difference in frame height.

Both are using torsion bars, by the way.

Ceramic Coatings

We mentioned life-time stainless steel mufflers a while back and an interesting new compromise appears to be a ceramic coating developed by the Bettinger Corp. of Milford, Mass. A ceramic skin about .003 to .004 in. thick is fused onto the metal surfaces, both inside and out. They say a guarantee of 100,000 miles is feasible and the cost is reasonable.

More on the Alpine

Since our September announcement of a new Sunbeam Alpine we have obtained more detailed specifications and data. The most interesting item is the fact that this is *not* a highly tuned Hillman engine, or even a modified Rapier. Just about every single major component is new and/or different. The cylinder block, for instance, has extra rigidity imparted by virtue of three stiffening ribs and a much heavier flange at the bottom. The crankshaft is made of a special high-tensile steel alloy and the connecting rod inserts are faced with lead-indium. As we mentioned before, the cylinder head is completely new, cast of aluminum and has alternating intake and exhaust valves. This arrangement has been used in some Ford V-8 engines for two years with the idea of giving a more uniform temperature distribution along the length of the engine.

Gross power is given at 83.5 at 5300 rpm, which, considering the displacement of 1494 cc, is very exceptional. This should be enough to insure a genuine 100 mph, as claimed. I don't think it will quite equal the MG-1600 in acceleration ability, though it will be mighty close.

Murphy's Law

From a Flight Safety Foundation, Inc., bulletin which came across our desk recently we quote Murphy's Law: "If an aircraft part can be installed incorrectly, someone will install it that way." This reminds us of a favorite saying of one of our early contributors, the late Charles G. Manning. In our words he said, "If a sports car part can be drilled it was too

heavy in the first place, and if it cannot be cut with tin-snips, the metal gauge is too thick."

Shades of Indianapolis

A news report from Canada says the Ford Falcon (with changes) will be assembled in that country and will be called a Frontenac. That's what Gaston and Louis Chevrolet called their racing cars and parts years ago.

Engine Cooling

Recently we received a press release from the Dow Chemical Co. which gives many valuable hints on the care and feeding of your car's cooling system. Periodic inspection and recommended procedures as to inhibitors, anti-freeze, etc., are good preventive medicine.

However, along with the good, Dow sends a bar graph purporting to show how cooling system capacities of late model cars have not kept up with the increases in bhp. This arouses us to make some comments:

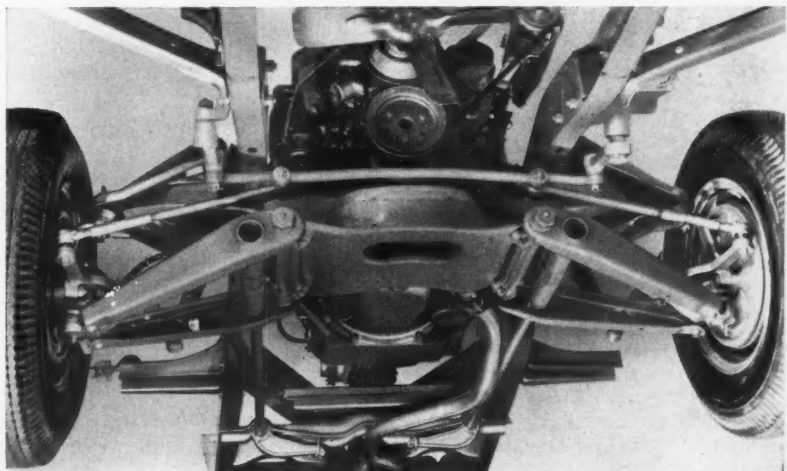
Liquid coolant is merely a convenient medium of exchange. It transfers heat from the engine proper to a radiator where air-cooling does the actual work. The amount of coolant involved (usually given in quarts) has practically nothing to do with measuring a car's cooling capacity in terms of its ability to cope with road conditions.

First, the power required to propel a given late model car at 60 or 70 mph is no higher than it was 10 years ago. Since heat lost to the cooling system is a direct function of power required there is no reason for using more liquid.

Second, if a car has more horsepower and is using it (as on a long steep grade at full throttle) the volume of coolant in circulation is still relatively unimportant. All we need is faster circulation, or more radiator frontal area, or a more powerful fan—or a combination of these.

The third item has to do with engine heat rejection and overall thermal efficiency. Engine design has come a long way since the early Ford V-8, which rejected about 5000 BTU's per minute (to the coolant) at 60 (continued on page 89)

Light trucks should be still more popular with Chevrolet's 1960 i.f.s.





INSIDE THE CORVAIR

A complete and comprehensive technical analysis by John R. Bond

TO US, the most interesting technical item on the new Corvair is not the powerplant location, but rather the type of engine chosen. Air-cooling, like the weather, is one of those things that everybody talks about. Unlike the weather, air-cooling is sensible, logical, and it works. Now, at last, we have it in a high-production American passenger car, Chevrolet's new Corvair. It has been a long wait; some of our readers may remember that Chevrolet announced an air-cooled car once before, the year being 1922 (Road & Track, March 1951). The ill-fated "copper-cooled", Chevrolet actually was completely tooled and a few pilot models had come off the line before they made the horrifying discovery that the semi-exposed rocker arm mechanism would not work in dusty areas. By the time GM Research came up with a very satisfactory solution (a knife-edge-type mechanism), the company had decided to forget the whole thing and leave the field to Franklin. (Rumors of patent infringement were not true and had nothing to do with the decision.)

Today, Chevrolet has the use of GM's vast test facilities

at Milford, Mich., and Phoenix, Ariz. Several million miles of road testing and many thousands of hours on the dynamometer insure that there will be no repetition of 1922.

The Basic Concept

In the General Motors Corporation, most of the more radical designs emanate from a Central Engineering Staff, known as "Product Study." However, though Chevrolet can and does draw upon the full range of Product Study's experience, the Corvair was originated and developed entirely by the Chevrolet Division. In 1945-46 Chevrolet had developed a light 6 known as the Cadet. Simultaneously, but in different offices, a Product Study group had developed a somewhat similar car for Australia, which became the Holden. Contrary to popular opinion these two cars were not at all identical, although both had water-cooled ohv 6-cyl engines. At any rate Chevrolet had plenty of background experience in the design and development of more compact cars, especially when one con-

siders the fact that all Chevrolets prior to 1933 had less than 110-in. wheelbase.

Despite prior experience with more conventional but scaled-down cars (or perhaps because of this experience), the new compact-car project began with no inhibitions whatsoever—the much desired “clean sheet of paper.”

It doesn't take much doodling on the drawing board (to scale) to discover the advantages of a rear-engined arrangement. There are some disadvantages too, of which the most obvious is an inevitably tail-heavy car. However, Chevrolet engineers noted that a compact front-engine car had, roughly, 55% of its weight on the front wheels, but when it was fully loaded the rear wheels carried 55% of the total weight. This switch creates some fairly nasty problems in order to get consistent handling. On the other hand, the rear-engine car presents handling problems of its own but at least there is no serious change in load distribution from driver-only to 6 passengers. The final package adopted has from 60 to 62% of its total weight at the rear and the recognized need for understeer and stability was solved by properly utilizing the tires and by suspension geometry. Chevrolet likes to point out, too, that the Corvair's distribution is no different from that of a typical loaded station wagon!

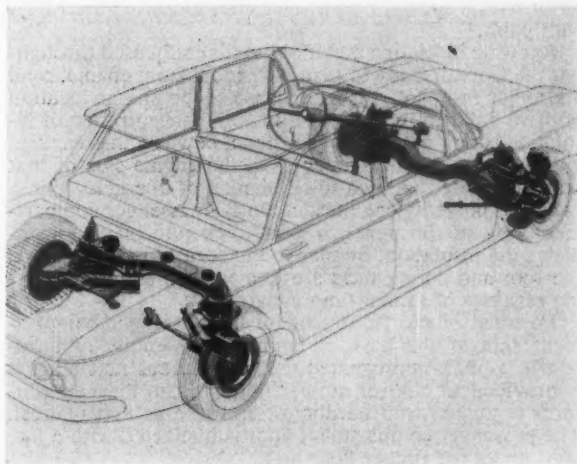
The Package

The over-all dimensions settled upon were 180 in. long, 67 wide, 52 high, and a minimum ground clearance of 6 in. The rear-engine mounting made the lowness very easy to achieve, and a front-of-dash line only 9 in. behind the front-wheel centerline proved to be feasible. Front leg room is generous at 42 in.; in the rear, there is 37 in. The transmission just forward of the rear axle wastes a little space, but the rear seat can be wider than if it were nestled fully back between the rear wheels. Hip room worked out at 57 in. front and rear.

Due to a virtually flat floor, the center passenger at front and rear has full cushion depth. A person of average weight sinks 4 in. into the cushions, leaving an ample 38 in. for head room.

The Unit Frame and Body

Though not new to the automotive industry, the Corvair's unit structure is the first U.S. application in high



All of the Corvair's suspension elements are carried on subframes which bolt to the unit chassis/body.

production. It is said to be 30% more rigid torsionally than the regular passenger car. No figures are available, but most cars average nearly 4000 ft-lb/degree, which would put the Corvair at about 5000. Weight saving is said to be approximately 60% of the weight of a separate frame. Since a separate frame for this car would weigh in the neighborhood of 225 lb, the indicated saving is 135 lb.

To provide the integral body/frame structural features, the Corvair underbody is especially reinforced, and side-rail-like members extend into both front and rear quarters. The principal reinforcements to the underbody are special box-section members concentrated adjacent to the box-section sills at the front and rear ends. The front and rear side-rail-like extensions are integrated into these heavily reinforced underbody sill areas. Further, the front and rear rail extensions are of flanged channel-sections that are completed as box-sections when welded to the front and rear wheelhouses. Prevention of corrosion is doubly important with unit construction, so all the principal underbody structural members are coated on the in-

Shown in profile are the Corvair seating package, luggage space, and mechanical elements.



terior with a special zinc primer and, following assembly, with paint.

Acoustic insulating materials are liberally used throughout the Corvair body to assure freedom from engine, road and other resonant noises. Because of the unique location of drive line components, the greatest concentration of insulation is on both sides of the panel between the rear seat and the engine compartment. On the engine side of that panel is located an inch-thick blanket of fiberglass with a facing of polyethylene plastic. On the passenger compartment side of the panel, a $\frac{3}{4}$ -in.-thick jute blanket completes the insulation. Similar to the regular passenger car, the roof and door panels are treated with sound-deadening blankets of asphalt-impregnated felt.

Forward of the front seat on the passenger compartment side of the dash, a laminated assembly of hardboard, asphalt-impregnated felt, and fibrous mat blanket is provided to control noise. Similarly, the luggage platform is treated with hardboard and fibrous mat blanket. The passenger compartment floor is blanketed with a jute mat, under the rubber floor mat.

Suspension and Steering

Chevrolet's philosophy concerning the riding qualities of the new car was simple—it had to ride as well as the larger cars. Here the lack of any significant change in weight distribution, with load, is an advantage. On a conventional compact car (i.e., engine in front) the change in rear-end loading amounts to over 60%. It is very difficult to design rear springs to do the job properly. Fully loaded, the rear springs would be deflected about 5 in., but with driver only, the deflection would be just 3 in. The latter figure is not enough to give an acceptable ride.

Because of the Corvair's weight preponderance at the rear, a very high spring rate of 192 lb/in. is used, yet the ride frequency is slow. Bump travel here (metal to metal) is 3.58 in., with 4.86 in. for rebound. This inherent stiffness, plus a high roll center (approximately 12 in. above the ground) insures modest roll angles in cornering.

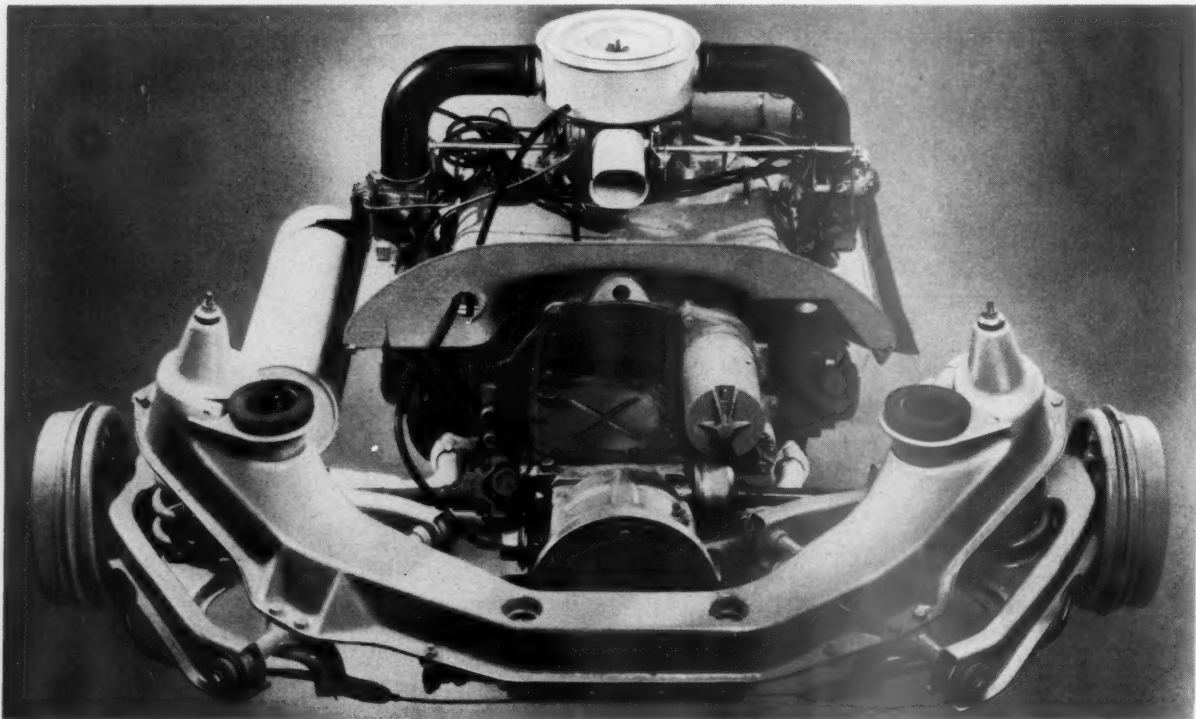
Technically, the Corvair rear suspension is pure "swing." Its nearest geometrical equivalent has been used for some time on the Fiat 600. The swing axes are diagonal so that as each rear wheel moves either up or down, it toes out. In spite of this Chevrolet press information says that the car has definite rear-end roll-steer in an understeering direction. If true, this feature, together with the tire pressures, gives the Corvair a positive understeer and makes it inherently stable at all times. The tire pressures of 15 psi front and 26 psi rear were selected on the basis of the actual loads carried. This feature gives the necessary high-speed, straight-line stability. The suspension design takes care of transient conditions and cornering.

The swing axes of the rear suspension system are arranged to pass through the universal joints on each side of the differential. Thus each half-shaft needs only one universal and no telescoping slip-joint at all.

A single control arm in the shape of a wishbone is used on each side, made up of two stampings welded together to form rigid box-sections. The inner ends pivot on rubber bushings, but the outer attachment is directly to the brake backing plate and wheel bearing housing. In the Fiat 600 design, minor discrepancies in alignment and normal deflection of rubber bushings are compensated for by using a sort of limited-angle rubber universal coupling on the axle shaft just inside the wheel bearing. Chevrolet engineers do the same thing in a different way; they avoid undue stresses and strains on the driving half-shafts by using a double-row wheel bearing of the "spherangular" type. These are not new and they absorb up to about 3° of misalignment without trouble. However, since the brake drums are carried (indirectly) by the axle shafts, they may tend to cock slightly with respect to the brake shoes and backing plates. This discrepancy is small, and the only trick required is to adjust the rear shoes 8 clicks looser than the front shoes.

The rear suspension control arms are attached to an independent cross member, making a neat and complete subassembly. This member is attached to the body struc-

Viewed looking aft is the engine, transmission and rear suspension.





The detachable front suspension unit.

ture by very large rubber-insulated bolts, and even the coil springs have rubber insulation where they seat in the cross member. Since rear end toe-in is important, this is made easily adjustable, either at the factory or in service, by suitable shims which move the entire engine/transmission/differential assembly forward or back as required.

Because the front end is lightly loaded, the ride rate of 86 lb/in. gives the required ride frequency for a flat ride, free from any sign of pitch. As was once Chevrolet policy, the entire front suspension is a unitized assembly, complete with cross member. As at the rear, rubber insulation is used at the arm pivots, at the tops of the coil springs and at the cross member points of attachment to the main structure.

Geometry at the front is fairly conventional, with brake anti-dive and roll center raised approximately 1 in. above the ground. Bump travel is 3.62 in. and rebound is 3.50 in.—surprisingly generous. However, it is worth noting that one reason such a soft suspension (for this size car) is possible or practical is the fact that the over-all center of gravity is quite low. The roll axis is a little higher than in conventional practice and the moment arm between this axis and the lower cg is therefore less than usual. This means modest cornering roll angles, even though the suspension is soft and no anti-roll bars are used at either end.

Ball joints are used, of course, and in the usual manner except that the lower ball stud has been inverted and carries its load in tension. This allows a shorter steering knuckle, which reduces unsprung weight. Additional unsprung weight has been saved by using tapered roller wheel bearings, which allow smaller wheel hubs. Brake drums of 9 in. diameter and 13-in. wheels also contribute to low unsprung weight. It is quite apparent that this car has an exceptionally good sprung to unsprung weight ratio—for its size.

The steering gear is a recirculating ball type with a ratio of 18:1. Its housing is aluminum, which allows the pitman arm shaft to turn directly in the housing without any bushing. The worm shaft ends just outside the housing, with a coupling to connect with the long steering shaft from the wheel. Surprisingly, this coupling has no flexibility or cushion, as do many imported cars. The reason

for the joint is ease of assembly. Steering linkage is the usual double-relay system, and the over-all steering ratio is boosted by the linkage to 23.5:1. With stops, this gives 4.8 steering wheel turns, lock to lock. Chevrolet engineers point out that this ratio is about 10% faster than might be apparent, in comparison with larger cars. They also feel that a large segment of Corvair sales will come from owners of large U.S. cars, who would be quite disconcerted during their first demonstration run in the Corvair if the steering action were completely unfamiliar.

Brakes

As mentioned before, all wheels carry 9-in. drums. These are cast iron with linings 1.75 in. wide, giving an effective area of 120.8 sq in. The shoes have the usual Bendix duo-servo action with wheel cylinder diameters of .875 and .9375 in. front and rear. This puts 54% of the braking effort in front and 46% at the rear, and is designed for the best possible stop under crash conditions. Ordinary use gives virtually equal lining wear, front to rear. The master cylinder has a 1.00-in. bore and the pedal linkage provides a mechanical advantage of 6.55:1.

The Engine

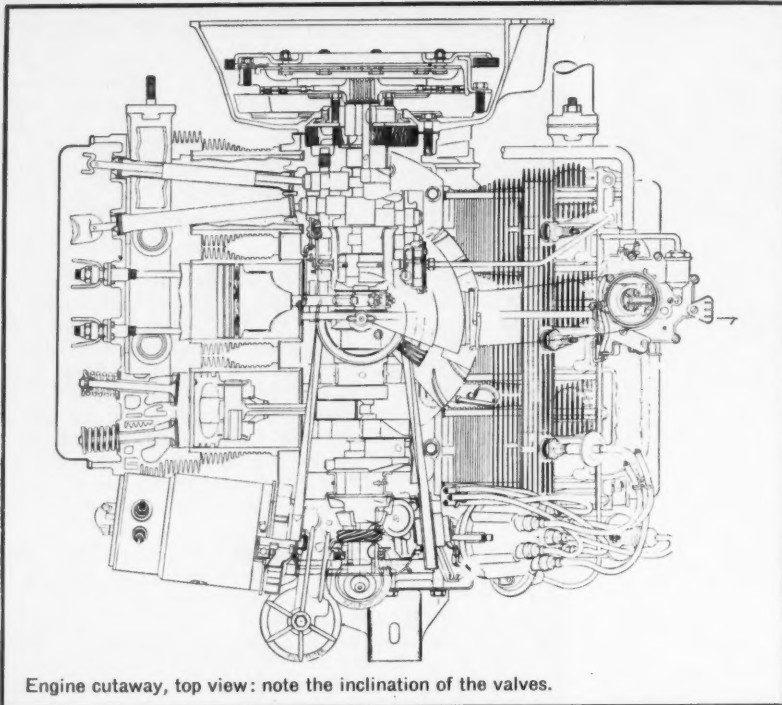
Chevrolet chose an air-cooled flat 6 for the rear-mounted Corvair engine. A displacement of 140 cu in. and an output of about 80 bhp were deemed sufficient to give a performance nearly equal to the big 6. Air-cooling has many obvious and well known advantages, which need not be explored here. The flat 6 is compact, fits into the "trunk" space easily, is inherently in perfect balance and is basically a smoother-running unit than a flat 4 or even a V-6.

The production version has a bore and stroke of 3.375 x 2.60 in. and weighs 300 lb with all accessories except a flywheel (for flywheel and clutch add 58 lb). A careful study of this engine shows that it is unique and has many clever features.

One of the most important features of the Corvair

The engine, minus its cooling shroud.





cooled engine heads in groups, but Chevrolet did it first (in pairs) back in 1922. There are two special features in the head design which make it practical to join 3 combustion chambers into one casting. The first trick is new to air-cooled engines, but has been used in some recent water-cooled engines. The intake and exhaust valves are merely arranged in that sequence all down the line; in other words, there is no pairing up of intakes or exhausts. Paired or siamesed exhaust ports, in particular, create a tremendous heat distortion problem in an air-cooled engine. The second secret is an old aircraft-engine fundamental: put cooling air all the way around and between all valve ports, as close to the actual valve seat as possible. Close examination of the Corvair combustion chamber in the plan view will reveal how it's done. The two valves are not only spaced far apart, they also have an included angle of $8^{\circ}22'$ to allow an even better air flow between them. (Porsche does it, too.) Note also how an exhaust port with extra large fins around it is allowed to encroach on the neighboring non-finned intake.

engine is the attention paid to achieving adequate structural rigidity—a tough problem to lick in this type of cylinder arrangement. In the first place, the crankcase is not a simple pair of semi-circular half-sections bolted together. These are, indeed, two halves bolted together, but the assembly is definitely a box-section and is quite heavy for permanent-mold-cast aluminum. Four bulkheads support the main bearings and a near-solid wall runs completely across the bottom to carry the cam followers. A large aluminum flywheel housing at the front (front, with reference to the car) and a large casting at the rear bolt on to add more rigidity. A third aluminum casting bolts on the top and it, too, adds to crankcase stiffness.

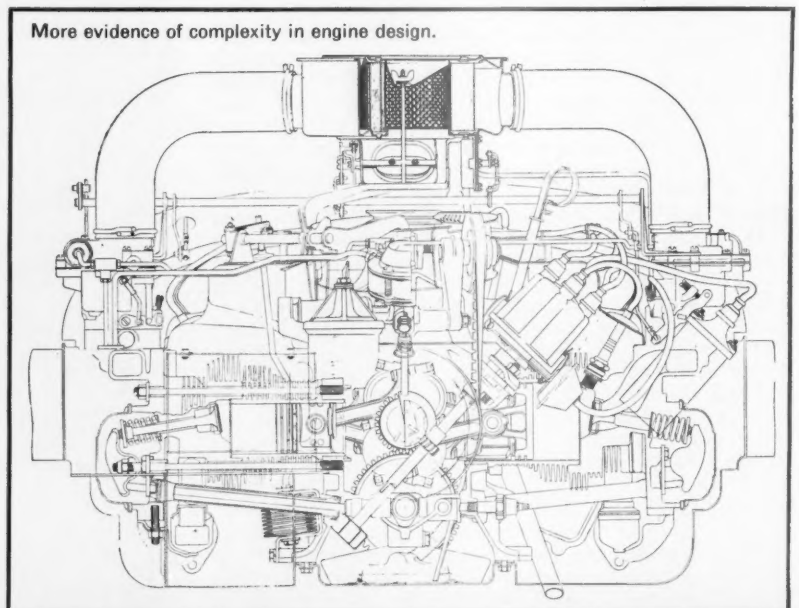
The 3 cylinders on each side are individual iron castings with machined diameters at each end. These spigot into the crankcase and into one-piece aluminum head castings. Conventional air-cooled cylinders tend to wobble and distort, but these "spigots" and a clever clamping system tie the whole assembly together so solidly that it achieves a rigidity unknown in this basic type of engine. The clamping scheme consists of 12 long alloy steel studs on each side, which run from the cylinder heads to the crankcase. Normal practice calls for 8 studs when 3 separate cylinders are used in line. The Corvair cylinders each have 4 holes drilled through the fins to accommodate the studs. This puts the clamping where it is needed without compromising the fins.

The head castings are identical, right to left, but are turned end-for-end when installed. Some years ago it was thought impossible to cast air-

This engine uses one more cooling secret which Corvair has wisely borrowed from the last side-draft-cooled

Franklin. Most air-cooled engine designers instinctively arrange for each exhaust valve and port to receive its coolant first. Unfortunately, this is very poor practice. The cool air strikes the hottest area first and is then too high in temperature to cool the rest of the cylinder head efficiently.

The intake valve, port and adjacent area runs much warmer than it should and this, though not dangerous at all, causes a tremendous loss in volumetric efficiency. Franklin, and now Corvair, prefers to cool the intake area first (it never gets hot anyway). The air then passes



around the combustion chamber and cools the exhaust area last. Not incidentally, another cooling feature that is entirely new concerns the exhaust outlet pipe. Usually we find two or more bulky tapped bosses per port to provide pipe attachment. On motorcycles a finned, threaded collar is used. The Corvair merely uses a simple tube pressed into the hole. This allows the achievement of much better air flow and cooling.

It is also interesting to note that the head castings have very thick metal sections. This is permissible because of the rapid heat transfer characteristic of aluminum. But this weight also helps stiffen the entire engine structure, tied together as it is by a total of 24 studs.

Having explained how the Corvair engine achieves an extraordinary rigidity for a unit of its type, we should mention that the performance of this engine gives no clue that it is unusual. (See our road test in this issue.) It is as smooth and quiet as any solid-iron unit, despite a compression ratio which would make a rough-running thumper out of a "conventional" air-cooled job.

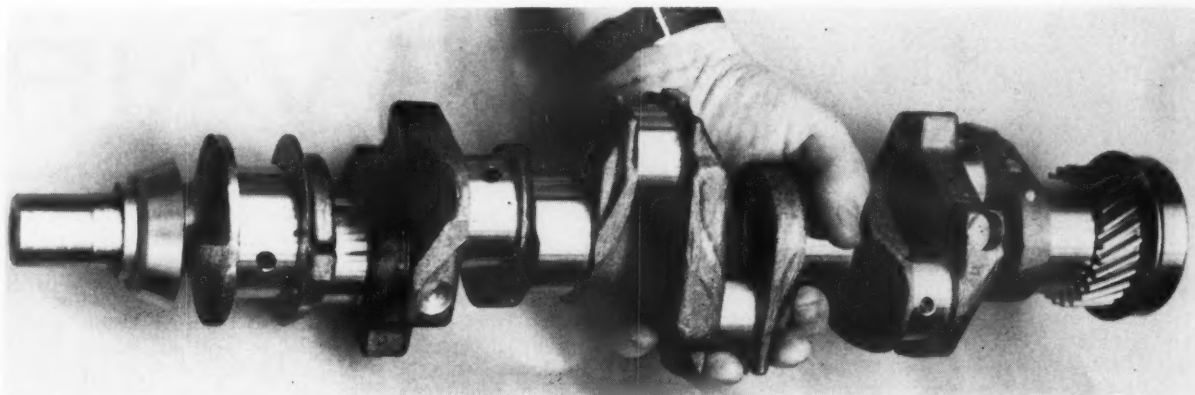
The crankshaft of this engine is also rather remarkable. Its arrangement is conventional with 6 throws arranged in pairs, but there are no counterweights. Its weight is approximately 25 lb, about half the weight of a comparable in-line engine shaft. Since it is also short, the ques-

very thin lead-babbitt overlay; fairly common construction.

Connecting rods are conventional and have a center-to-center length of 4.720 in. The diameter of the wrist pins is .800 and they are press fitted in the rod, using no retainers. The pistons are tin-plated aluminum alloy, with steel struts for expansion control. The skirts are of slipper design, and the nominal skirt clearance of .0011 to .0015 in. is rather remarkable for an air-cooled engine. The usual 2 compression rings and one oil control ring per piston are used.

As hinted earlier, the valves are slightly smaller than normal for a 3.375-in. cylinder bore. The intakes have a head diameter of 1.340 in. and exhausts are 1.240 in. Both have 45° seats and a nominal stem diameter of .3415 in. There are no valve guides, but valve seat inserts of special ferrous alloy are shrink-press fitted into the head. Nominal valve spring pressure is 61 lb with the valve closed and 145 lb with the valve open.

The camshaft is alloy-cast-iron and runs directly in the aluminum alloy crankcase with pressure lubrication, of course. The cam arrangement is unique in that there are only 3 exhaust cams, but these are of more than double width. This is merely an expedient made possible by the usual offset banks of an opposed engine. Valve timing is 15-37-59-13 and the valve motion is assisted by a 1.57:1



The short, rigid, four mainbearing crankshaft.

tion arises as to how this is done and whether or not it is adequate. Here the answer lies in the very narrow heavy-duty bearings and the short stroke. Torsional rigidity is demonstrated by the surprising absence of any form of torsion damper. Visual evidence of rigidity can be seen in the thick crank cheeks.

Another surprising feature of this crank is the method of driving the flywheel. Traditionally, all crankshafts have a large integral flywheel bolting flange to avoid a failure at this spot, which is close to the nodal point. The Corvair shaft is actually turned down to a smaller diameter than the main journal and a separate bolting sleeve is pressed on, with only a simple Woodruff key to do the driving. This flange also incorporates the crankshaft timing gear, which is another departure in design though a few foreign cars have carried their timing drive adjacent to the flywheel.

The crank is an alloy steel forging. All main bearings measure 2.0983 in. in diameter, while the crankpins are 1.800 x .649 in. The front main bearing (adjacent to the flywheel) has a length of .828 in., and the other three measure .772. Bearing material is steel backed, with a sintered copper-nickel layer which is faced, in turn, by a

rocker arm ratio to give a lift of .3601 in.

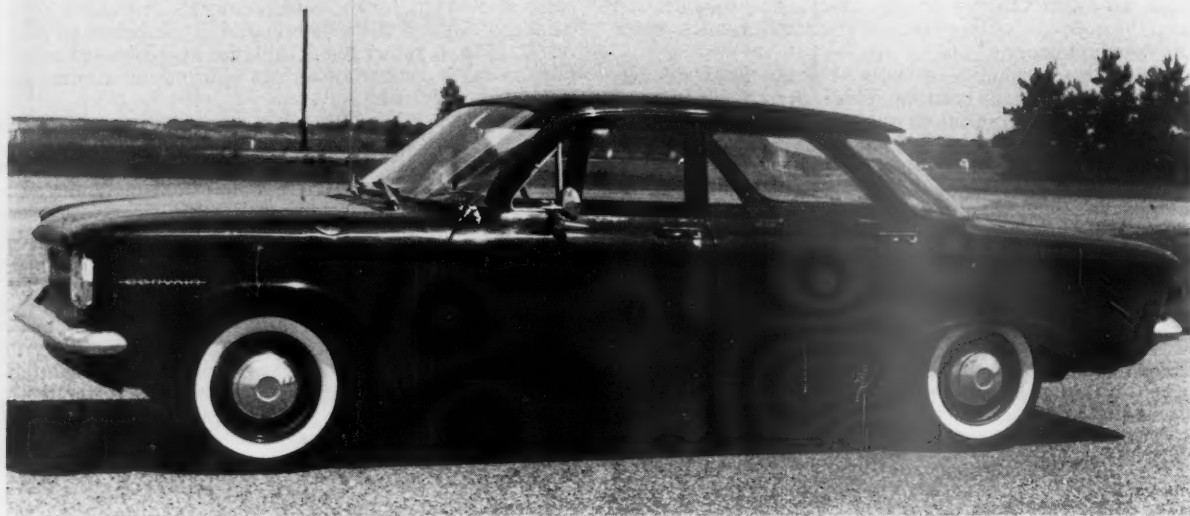
The rocker arms are stamped steel, of the type used on the V-8. These have a single ball-socket pivot, which is supported in each case by an extension of the appropriate cylinder stud. The most interesting part is that the ball pivot makes the 8°22' included angle between valves no problem at all.

Hydraulic tappets are used. These sit dead-square and the pushrods angle as required to pick up the rockers. The pushrods are tubular and are used to supply oil to the rocker-arm mechanism. Each pushrod is surrounded by a steel tube, fitted with O-ring-type seals at each end. These enclosures serve as drain-back lines for oil from the cylinder heads.

The casting at the rear of the crankcase carries an ordinary distributor and the lower end of this shaft drives a conventional gear-type oil pump with a relief valve set for 35 psi. This same casting also provides passages for oil distribution to the crankcase, an oil filler tube and a mounting for the fuel pump.

The oil sump is sheet steel and holds 4 qt. All oil goes first to a full-flow filter before delivery to the engine. There is also a sheet-aluminum (continued on page 92)

road test



CORVAIR

Away with the myths, up with an important and very sound new car

PRODUCTION of Chevrolet's new compact car began in July, and early in August Road & Track was invited to see and drive the new baby. Armed with stop watches and our trusty Tapley meter, we drove out from Detroit to the famous GM proving grounds near Milford, Mich.

The Corvair's announcement date was two months away, and security regulations in the form of passes, etc., were very strict. However, we got through with no difficulties and were cordially received at the Chevrolet Divi-

sion's experimental garage within the proving grounds.

After a slight delay, we were admitted into the main area. Here cars of all sizes and types, including several compact cars with weird fins, were sitting around. These, it seems, were the jokers, designed to mislead the competition. Finally we were led up to a neat but plain black 4-door sedan. This was a standard production Corvair with stick shift, and it was to be our test car.

The Corvair, as everyone knows by now, is an ex-

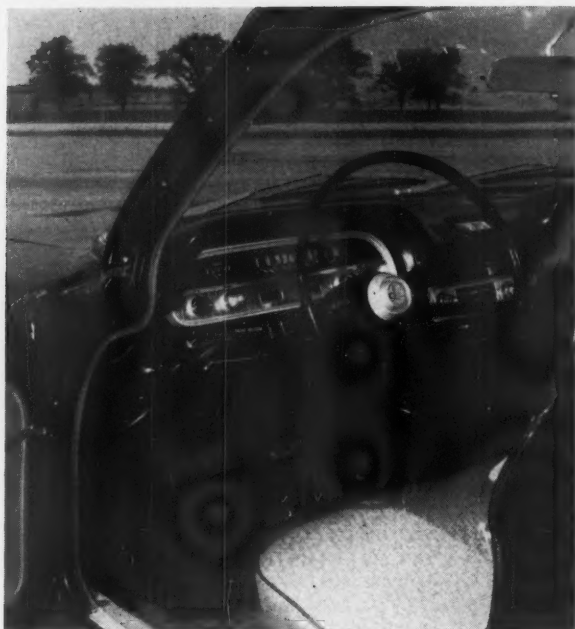
The lack of a phony grille is to GM designers' credit.



Cooling air goes in atop the deck, out under the bumper.



PHOTOS BY POOLE

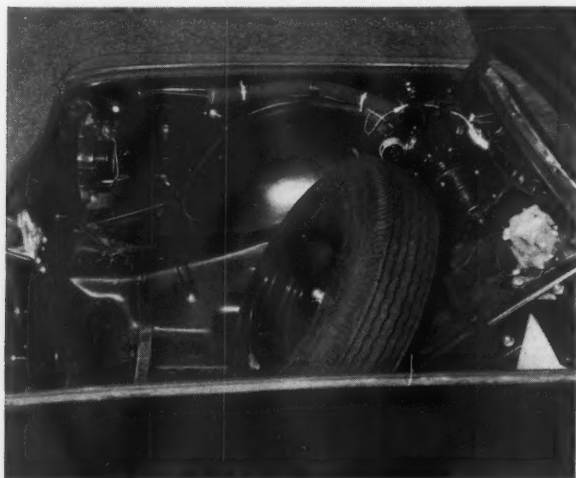


Low seats, but no windshield post to dodge, and no hump.

tremely astute package: very good looking, extremely low, and one which, though compact, seats 6 adults in comfort. The car is very well planned from bumper to bumper, from the inside to the outside. It truly was designed from a clean sheet of paper to do a job and to do it efficiently and properly. Hip room, leg room, head room—all are so nearly equal to what has become standard practice in U.S. cars that all excuses for having a “big” car become silly. Shoulder room (at 53.6 in.) is somewhat less than some of the 80-in.-wide (over all) cars of 1959, if that’s any drawback. The Corvair’s very nearly dead-flat floor makes the large 6-seater even sillier. The central tunnel, such as it is, measures about one in. high and 4 in. wide and is quite flat on top. It is primarily for the purpose of housing the necessary control rods and goes virtually unnoticed.

A second surprise offered by the Corvair is the general tenor of its noise level. When it goes by, the sound is like that of any other conventional car; the coffee grinder effect of most air-cooled engines is missing. (continued)

Needed: a Dauphine-like spare tire mounting underneath.



ROAD & TRACK ROAD TEST 224



CHEVROLET CORVAIR

SPECIFICATIONS

List price	n.a.
Curb weight	2450
Test weight	2770
distribution, %	39/61
Dimensions, length	180
width	66.9
height	51.8
Wheelbase	108.0
Tread, f and r	54.0
Tire size	6.50-13
Brake lining area	121
Steering, turns	4.8
turning circle, ft.	39.5
Engine type	flat 6, ohv
Bore & stroke	3.38 x 2.6
Displacement, cu in.	139.6
cc.	2288
Compression ratio	8.00
Bhp @ rpm	80 @ 4400
equivalent mph	87.5
Torque, lb-ft	125 @ 2400
equivalent mph	47.7

PERFORMANCE

Top speed (mf), mph	88
best timed run	n.a.
3rd ()	
2nd (4500)	49
1st (4500)	27

FUEL CONSUMPTION

Normal range, mpg	24/29
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ACCELERATION

0-30 mph, sec.	5.8
0-40 mph	8.8
0-50 mph	14.4
0-60 mph	19.5
0-70 mph	27.0
0-80 mph	38.5
0-90 mph	
0-100 mph	
Standing 1/4 mile (est)	21.7
speed at end, mph	63

GEAR RATIOS

O/d (n.a.), overall	
4th (n.a.)	
3rd (1.00)	3.55
2nd (1.84)	6.52
1st (3.22)	11.4

TAPLEY DATA

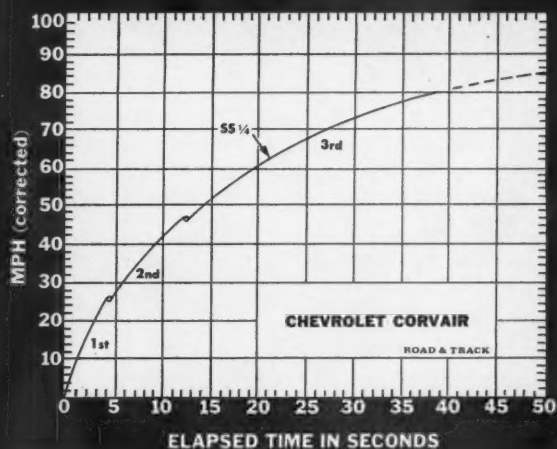
4th, lb/ton @ mph	@
3rd	190 @ 45
2nd	350 @ 35
1st	510 @ 20
Total drag at 60 mph, lb	127

CALCULATED DATA

Lb/hp (test wt)	32.6
Cu ft/ton mile	88.2
Mph/1000 rpm (3rd)	19.9
Engine revs/mile	3020
Piston travel, ft/mile	1310
Rpm @ 2500 ft/min	5770
equivalent mph	115
R&T wear index	39.6

SPEEDOMETER ERROR

30 mph	actual 29.5
40 mph	39.1
50 mph	48.8
60 mph	58.6
70 mph	68.5
80 mph	78.4
90 mph	
100 mph	



Gear noise, too, is conventional; there is none of the typical whine normally associated with rear-engined vehicles. Inside the car, the effect is quite unlike anything we have ever experienced. It almost seems that there is no engine, and the general effect is so quiet as to be almost uncanny. Obviously, Chevrolet engineers have taken full advantage of the engine location and have completely eliminated the usual air-cooled engine noise, as well as rear-engine gear whine.

The next driving impression is perhaps the most pertinent of all, considering the idle (and uninformed) gossip concerning the car's handling qualities. The steering is slower than we personally like (4.8 turns, lock to lock), but it is exceptionally light both during parking maneuvers and brisk cornering. It is not quite so light as a VW, perhaps, but nevertheless it is very satisfactory. In technical terms, and despite a rear-end weight of 60-62% of the total (dependent on load), the Corvair positively understeers under any and all conditions, up to the point of total loss of adhesion. This is accepted as the best design practice and only during the wildest possible cornering is the effect lost. Only then does the rear-end weight make itself felt, with the usual and expected result—on a total spin-out the rear end swings out into oversteer.

Several reports on the Corvair's handling qualities have incorrectly emphasized the importance of its special tires. The Corvair's tires are of an improved type to be used on all makes and types of 1960 cars. Corvair does use extra-wide-base rims (5.5 in.), and varying front and rear pressures are specified according to the load carried. The rated load capacity of a standard 6.50-13 tire is 835 lb when inflated at 24 psi. Since load capacity varies almost directly with pressure, the Corvair's specification of only 15 psi at the front is not under-inflation: the two tires at 15 psi are designed to carry only 62.5% of their rated load or 521 lb each. This is very close to their actual loading as tested.

All the gossip about this car's dangerous handling characteristics can be dismissed. Summarized, this is how it handles:

- 1) It definitely understeers at all times.
- 2) The understeer is less than usual and the car is much easier to "hold" in a high-speed bend.
- 3) The light understeer does not change with loading. It's the same whether the driver is alone or has 5 others with him.
- 4) On total spin-out (or loss of all adhesion) the Corvair's tail goes out and through the fence first. (A nose-

heavy car will generally go through the fence nose-first.)

As for performance, we were frankly a little disappointed. For example, four trials from a standstill to 60 mph (corrected, by GM fifth-wheel-type electric speedometer) gave only 19.5 sec. We expected better acceleration times, and in this connection we can only say that the car falls well below the norm of ability when compared to others of similar power to weight ratio. This deficiency seems to be due primarily to the engine's inability to rev, with the specification of only a 3-speed gearbox as a secondary factor. The first 0-60 mph run took 22.5 sec and even in four subsequent tests (which averaged 19.5 sec) the engine seemed to fall off very rapidly at speeds of 25 in first gear and 45 mph in 2nd. Obviously economy and durability have taken precedence over high engine speeds, and it is a fact that at least one 1.6-liter imported sedan will trim the Corvair.

However, none of the imports can even come close to the Corvair's amazingly low wear factor of under 40 (engine rpm x piston travel per mile, divided by 100,000). In this connection we might also note that the usual conversion for computing safe cruising speed (2500 fpm piston speed) gives a theoretical 115 mph for the Corvair. Of course it won't go that fast even down the side of a mountain, but at least this means an absolutely unburstable powerplant. Top speed was given to us as an honest 88 mph; we believe it accurate. There was also no opportunity to check fuel consumption, but no driver need expect less than 25 mpg and careful, steady driving should give 30 mpg or even better.

Although the car looks extraordinarily small from outside, it is very easy to enter at both front and rear. Once inside, the space quickly dispels any early impression of a miniature car. The front seat, for example, has a hip room dimension of 57.8 in. An offset gear lever curves upward from the floor and is easy to operate, though a little restricted, with three adults in the front seat. The optional 2-speed automatic transmission avoids this difficulty but we didn't even try one. All controls are well placed, and certainly this is one of the easiest cars to literally jump into and take off. The clutch and brakes are light in action, and the brakes appear to be almost fade-proof because of ample provision for air circulation (9-in. drums, 13-in. wheels) and because braking effect is almost equally divided front to rear. The shift lever provides a feel that can best be described as similar to a Volkswagen. There's a little play, but gear engagement is quick and positive. Our car had a tendency to stumble a (continued on page 80)

Stubby at the rear as well as the front, the Corvair has a light roof structure. Bumper bracket is for mounting 5th wheel.



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DETROIT BEAT

BY DON MAC DONALD

VERY FEW PERIODS in the 77-year history of the American automobile industry justify the label "revolutionary," and those that appear to qualify are most often hard to pin down. Certainly the first car built for sale deserves a listing, but archivists are still arguing over whether it was Winton's or Duryea's. And there was the era of the Model T, but it was around for some time before it could lay claim to putting the nation on wheels. Some like to cite the self-starter and Dodge Brothers' all-steel, closed body. Others note the individualism of the early Twenties, clichéd perfectly by the Stutz Bearcat.

Harley Earl must be acknowledged for his 1927 LaSalle which, according to GM's press agents, was the first car to be styled by a stylist. Since styling and streamlining are not necessarily the same, perhaps Graham's 1932 Bluebird should be elevated from obscurity. Then came the period of the great classics, cars that in all too many instances reached a peak of development in bankruptcy. These were all milestones, as distinguished from such latter-day phenomena as Buick's portholes, the wrap-around windshield, or a mechanical breakthrough like the high-compression V-8 coupled to an automatic transmission.

Nearsighted industry observers are inclined to celebrate the recent rise and fall of factory-sponsored stock-car racing, along with the elephantiasis of chassis and body that made a spiral of this horsepower race. They may be right. At least the excesses of the Fifties opened that righteous funnel through which poured thousands upon thousands of Volkswagens and their retinue of lesser imports. But regardless of Detroit's stand on international tariff policies (unanimously in favor of complete abolishment), the fact remains and is sorely recognized that every time an imported car is sold, a home-grown product remains unbuilt. Thus, what some may call an era was really a kind of puberty.

Detroit, stung by lessons from abroad, finally is doing some product planning worthy of adults. The Corvair, Falcon and Valiant, as well as the Rambler and Lark, are merely the first manifestations. On the drawing boards, and in some instances given preliminary OK for production, is a myriad of interesting automobiles that, coupled with the selection of new, firmly established imports, will give a man the same degree of choice he normally enjoys in a clothing store.

A lot has been said about the demise of the automobile as a status symbol in America. This is a lot of patent hogwash. Anything that costs upwards of \$2000 and usually more is bound to be given deep consideration by the purchaser. A man's choice of cars is as much a part of his psyche as is his necktie. A fellow who insists on a stick-shift, 6-cyl, black, 2-door Chevy is the stick-shift, 6-cyl, black, 2-door Chevy type, whatever his bank account. The fellow who prefers a second-hand, loaded two-tone Buick at the same price will continue to prefer it.

Some people have always been reasonably well taken care of by Detroit. They are the majority that will continue to be. But what is new, what is shaping up into a new era, is Detroit awareness that a large number outside of this tedious majority wish to personalize their transportation, much as they personalize their homes and clothes and food. To the industry, now getting ready to satisfy this wish, it will mean the difference between a five-million and seven-million car year. Swimming pools and hi-fi have nabbed these dollars heretofore purely by default.

The Thunderbird, of course, was the first tentative step in this direction. Once it was given four-passenger practicality, it caught on famously; in fact, so well that owning one is no longer testimony to one's taste. Ford knows this and therefore is feverishly planning a line of T-Bird-like cars, ranging from an austere runabout to a super luxurious version destined to replace the misplaced Continental. For those who appreciate compactness without necessarily wanting to give up extra ashtrays and foam rubber cushions, there will be by 1961 a totally new Edsel. This car will be somewhere between the Falcon and the regular Ford in size, but its insides will be more akin to the Mercedes 220. Personalized transport invariably opens up the market for plush compactness.

The new Edsel will have yapping at its exhaust an aluminum V-8-powered offering by GM's Buick, Oldsmobile and Pontiac Divisions. As noted last month in this column, the engine will be in front and the body shell will not be interchangeable with the Corvair. It will be a quality car, selling for upwards of \$3000, and here there is a gap to fill. Chrysler, too, has tentatively reserved the DeSoto nameplate for another entry in this new class. Design activity in this area has actually snowballed to where auto men are incautiously talking of two medium-priced fields—one occupied by the Impalas, Fairlanes and Furies of today, and the other by the plush, compact newcomers. What will happen to Buicks, Mercurys and DeSotos as we know them is anybody's guess.

Nor will the compact cars just introduced stand still in design. Following the economical pattern created by Rambler and Lark, each make will gradually augment its roster of body styles. These will be basic styles, though, such as convertibles and station wagons; the pseudo-different like the hardtop will be left to the new Edsel class. Compactness will even drift into trucking. Pickups and panels are in the works for Corvair, Falcon and Valiant, and the Willys people may soon see the day when they are no longer alone with a compact, 4-wheel-drive sportsman's vehicle.

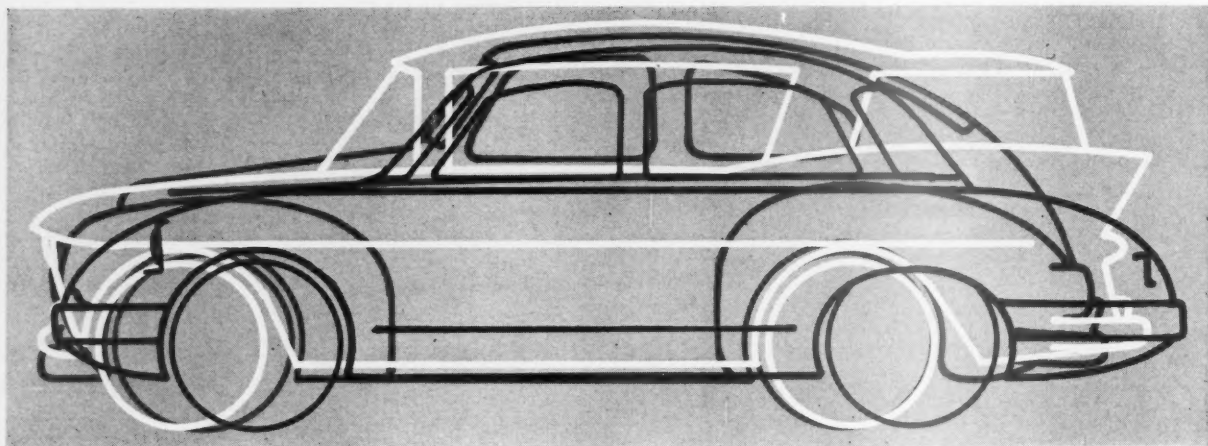
Though there will always be a Cadillac, probably with fins, standard-sized cars will be injected with new engineering life. Ford by 1963 and maybe sooner will go to front-wheel drive in all of its lines. The big Chevrolet plans to move its engine back to the trunk in that year. Other makes will by then have followed the transaxle route to eliminate the tunnel. This will permit an immediate 4-in. drop in over-all height without affecting road clearance or interior room.

The trend to personalization will go a long way, per se, in eliminating the sameness characteristic of American cars. Just as the Corvair is styled like no other car on the road today, Ford's front-wheel-drive models will be forced into distinction. With chrome in disfavor, differences must be achieved in other, more refreshing ways.

This, then, is the new era ahead. While the roster of makes is more likely to diminish than increase, the variety available will shortly be infinitely greater. Harry Truman once said that even stocking a thousand different ties wouldn't insure a sale, but at least Detroit now acknowledges your right to some choice. ■

Three of them? There are 21!

COMPARING THE COMPACTS



WITH the arrival of new compact cars from the Big Three, one tends to overlook the fact that there are, all told, 21 cars to choose from—assuming that a “compact” is a car having a wheelbase of 100 to 110 in.

Although Plymouth's new Valiant will not be announced until later this month, we know enough about it to include it in our comparative analysis and in the accompanying specification chart. For now, suffice it to say that we have seen (but not driven) it and its appearance is genuinely unique, with a definite European flavor.

To us the most wonderful part of the entire picture is the fact that the compacts from the Big Three are so different from each other. Carried further, and including all 21 cars in this category, we have an even wider variety. There are cars from England, France, Germany, Italy, and Sweden as well as the U.S. Amazingly, only the Corvair has a rear engine, and only one car, the French Panhard, has front-wheel drive. You can choose any number of cylinders from 2 to 8, though all have 4-cycle gasoline engines.

Jaguar gives the best over-all performance in the group, as might be expected. It has nearly twice the horsepower of any other compact and, of course costs nearly twice as much as any of the “Yanks.” (Prices of the Big Three cars are not available as this issue goes to press.) The next-best performer is hard to pick. It is very close between the Valiant, the Mercedes 220 and the Volvo—take your choice.

A comparison of over-all fuel economy has not been given because 1) it's not too important, so long as the car really is more economical than a full-size car and 2) most of the group falls very near the 25-mpg figure. Exceptions are the Jaguar (about 20 mpg), and the Panhard (about 33 mpg).

Top speeds are given as honest timed figures, not best

speedometer readings, downhill. Most of the cars come very close to 90 mph, which should be enough.

The high-gear pulling power of each car appears in the table. This is an accurate index of acceleration and hill-climbing ability in that gear. All ratings are based on high gear, as used on the stick-shift model. The Jaguar, for example, tops the field with 265 lb/ton with a 3.54 axle, its standard ratio for cars without overdrive. Readers should note that 10 of the imports listed have 4-speed transmissions (Austin, Borgward, Fiat, Jaguar, Mercedes 190 and 220, MG, Panhard, Peugeot and Volvo). Such cars can advantageously pull a lower numerical axle ratio because they have a useful 3rd gear for acceleration and/or climbing. However, the very nature of a low numerical axle ratio holds the best lb/ton reading down to a lower value than is normally used (or acceptable) for a car with only 3 speeds forward.

The wear index column gives our own formula for providing at least a rough idea of a car's durability. (Index = engine revs/mile x piston travel in ft/mile ÷ 100,000.) Some cars, like the Volvo, achieve satisfactory mileage between overhauls despite a high wear index. In general, however, anything much over an index number of 60 is suspect, unless the manufacturer has a very good reputation for long-lived automobiles. On the other hand a very low index, such as the Falcon's 32.2, may indicate mediocre performance. Ford engineers neatly got around this by holding the Falcon to its weight target.

There is no easy method of accurately evaluating ride and handling qualities. Even “experts” often disagree rather seriously. We will merely state here that in our experience with these cars (except for the untried Fiat and Valiant) the softest rides are provided by the Lark in the American group and the Jaguar in the import category. Among the Americans, the Corvair is the best hand-

ling, but the Falcon rates the best combination of ride and handling. Among the imports, we feel that Mercedes and Peugeot, though different from each other, are the best and about even as to combined ride and handling.

Our specific comments which follow are fairly blunt and readers should bear in mind the trite old saying about "one man's meat . . ."

American Motors' *American* is, in our opinion, a pretty terrific competitor in the battle of the compacts. Its only serious fault is that it isn't very new or stylish. In all the hullabaloo surrounding the new compacts the American still stands out as a competent challenger. It has excellent all-around performance, and its handling qualities and durability are very good. The ride is undoubtedly the firmest in the U.S. group, and we like this (Road Test, R&T, March 1959).

The "big" *Rambler* from AMC is the firm's breadwinner, and accounts for about 75% of its sales. Although a V-8 engine is optional, the ohv 6 is by far the more popular, and rightly so. The ride is softer than the American and handling is nearly as good, but with more cornering roll. Performance is only fractionally better than the American. Nevertheless this is a very good, sensible automobile for those who want more interior room and luggage space than offered by the 100-in. model (this car has not been road tested by R&T.)

Chevrolet *Corvair* (see Road Test, page 28).

Ford *Falcon* (see Road Test page 35).

Plymouth *Valiant* (no details available until Oct. 25).

Studebaker *Lark*. This compact is a bit of an anomaly. The V-8 engine option gives terrific performance, mediocre handling and better economy than the 6. On the other hand, the 6 gives mediocre performance, fair handling and poor economy. The over-all Lark package is very good, and has plenty of room. The ride is exceptionally good and even the nose-heavy V-8 handles well in comparison to most larger domestic cars (though not so well as the best, the Plymouth Fury). In our road test of the straight stick-shift 6 (R&T, March 1959) we commented on the low level of performance and economy, and we still feel that a slight change in axle ratio and minor changes in carburetion could make a world of difference in the 6.


Among the imported compacts, we rate the Borgward, Zephyr, MG, Peugeot and Volvo as outstanding. The Jaguar, Mercedes and the new Fiat are all interesting, but are too expensive to compete directly or seriously with the six U.S. compacts.

The *Borgward* has made an enviable reputation for itself, and the TS version will improve substantially on the performances quoted here. However, it does cost several hundred dollars more, and the standard 66-bhp model is a better buy for most prospects. Biggest disadvantage for this marque is that it is available only with 2 doors. (Road Tests, July 1955, Sept. 1956, and Aug. 1958.)

We haven't tested a British *Ford Zephyr* (or the more deluxe *Zodiac*) in several years; this has been purely an oversight. The *Zephyr* is a very good automobile—plenty of room, brisk performance, good economy and fantastic cornering. It can give its new American cousin (the *Falcon*) a good run, though it will probably cost a little more to buy and will not ride as well.

We tested the *MG Magnette* sedan last month. We think it is a much better car for most users than its sister, the *Austin A-55*, particularly for long-distance travel.

The *Peugeot 403* is a car we call a sleeper. It has good-looking, well-proportioned lines (by Farina), but it is not striking. Performance is good, but not startling. It has the advantage of 4 speeds, but the shift pattern is standard U.S.—plus an extra slot for overdrive. The best features of this car are its quality and durability, for which it has a tremendous reputation throughout Europe. It also handles more nearly like a good sports car than any sedan you can name (near verbatim quote from Phil Hill). Our test appeared in July, 1958 and there have been only minor changes since.

The *Volvo* we call highly competitive is not the strange-looking PV-444 (2-door sedan), but the new 4-door model 122-S known as the Amazon. Though not an Amazon at all by U.S. standards, it has a good seating package, acceptable appearance, terrific performance and is undeniably a "superb product of Swedish engineering." It is interesting to note that, per our recent road test (September 1959), the Volvo outperforms all the domestic compacts except (probably) the *Valiant*. The car's worst fault is a somewhat rough and noisy engine. 

size and performance

Make & Model (U.S.)	wb	o/a	bhp	mph	0-60	lb/ton	wear	Remarks
AMC American	100.0	178	90	86	16.0	220	48.6	Still a good buy
AMC Rambler*	108.0	191	127	94	19.0	210	45.1	Good, but heavy
Chevrolet Corvair	108.0	180	85	88	19.5	190	39.5	Good engineering, best looking
Ford Falcon	109.5	181	85	87	17.9	200	32.2	Excellent ride/handling combination
Plymouth Valiant*	106.5	184	115	95	16.0	220	47.4	Unique styling, very good performance
Studebaker Lark	108.0	175	90	80	21.0	185	52.0	Clever, but needs improvement
(Imports)								
Austin A-55	99.3	178	53	80	21.7	210	83.0	At its best in the city
Borgward	102.4	173	66	83	22.4	170	64.8	Solid Teutonic design
Fiat 2100*	104.3	176	95	93	19.0	210	64.6	Untried, but looks good
Ford Consul	104.5	172	59	80	22.5	185	68.0	Not to be overlooked
Ford Taunus	102.4	172	67	82	18.5	160	56.3	Odd styling, well built
Ford Zephyr*	107.0	179	88	88	16.4	210	55.0	Neat package, good performance
Jaguar 3.4	107.4	180	210	120	10.4	265	51.4	Smashing performance, expensive
Mercedes 190*	104.3	177	84	83	20.5	170	66.0	Most expensive 4 on market
Mercedes 220	108.3	187	92	91	15.0	210	57.0	Balanced, all-around design
MG Magnette	99.3	168	66	87	19.1	165	73.5	Italian styling, roomy
Opel Rekord	100.0	175	56	80	19.6	205	57.5	Not everyone's cup of tea
Panhard-Dyna	101.2	180	42	81	24.0	125	78.0	For 2-cyl. enthusiasts
Peugeot 403	104.7	176	65	84	20.5	140	62.6	Best handling, top quality
Simca V-8	105.9	187	79	88	17.2	190	54.6	Uses refined Ford 60 engine
Volvo 122-S	102.4	173	85	92	16.2	175	67.6	Lives up to its slogan

*R&T estimate. All data in high gear, no overdrive.



ROAD TEST FORD FALCON

Congratulations, Mr. Walker. A difficult job well done

FOR OVER 25 YEARS the Ford Motor Company has been besieged by the cry, "Bring back the Model A!" As far as we are concerned the new Falcon 6 is a reasonably close facsimile, at least in terms of what the Model A might have been if it had continued with year-to-year improvements. Automobile design can never stand still, but the basic concept of the new Falcon is pretty much that of the Model A—good, solid, honest transportation. At this point some of our readers are bound to remark that the Falcon is a 6 and that Henry Ford had no use for this "odd" number. However, one of the earliest Fords was a 6 (the Model K), and late in 1940 the company introduced another 6 (a darned good engine) which lasted right up to 1952. They then switched to an ohv short-stroke engine which has been the most advanced 6-cyl design in the U.S. to date.

Strictly speaking, the Falcon project started in July 1957, but this is only a part of the background story. Since 1945 Ford has done a great deal of small-car engineering work, most of it unknown to the general public. The people responsible for this advanced engineering ultimately came to be known around Ford by the code name "XK-Thunderbird," and it was this design group which engineered Ford's light car of 1945-46 (a side-valve 6). A later project was the much publicized 5-cyl in-line; obviously, neither got into production. Cars from the XK group that did get into production include the Ford Vedette (the French-built V-8 60, now a Simca), the Consul and Zephyr (British), the Ford Taunus (German) and, no surprise, the 2-passenger Thunderbird! All these were designed, engineered and developed at Dearborn.

Our first look at the XK group's latest effort took place in the experimental garage, located in a building which once produced the famous old Ford-Stout tri-motor monoplanes. The car itself, a 4-door Falcon, had been specially prepared for the press and it stood out like Cinderella on skid row among the dull and dirty experimental test cars in the area. Although it had the optional automatic transmission, we took it out for a few laps on the short test track and then posed it for the photographs you see here. Later, the car we had asked for, a stick-shift model, supplied the test data.

Engineers, if left to their own devices, would never finalize on specifications. Of dozens of Falcons we saw in the garage, only one was the exact model scheduled for production. If this seems strange, bear in mind that secrecy is very important in the automotive industry (several cars had Zephyr bodies). Furthermore, engineering evaluation must be on a comparative basis—i.e., change one thing at a time and try it out. Our actual test car, for example, did not have the front suspension of the auto-



Form follows function and with a minimum of fuss.



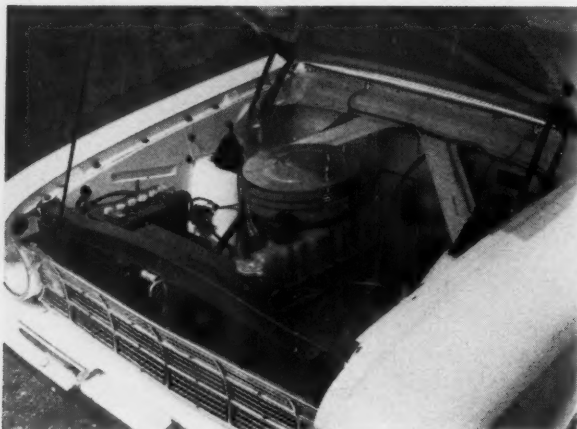
R&T publisher John Bond emphasizes low build of Fo-Mo-Co's new Falcon.

matic-equipped press car we tried earlier. Frankly, we couldn't tell the difference.

Driving impressions of the Falcon are not difficult to describe, but do not sound glamorous. In simplest terms, everything has been extremely well planned, and there's absolutely nothing basic to criticize. The seating position is excellent, the visibility good, the controls smooth and light. The car feels like and is a very brisk performer: it will readily out-accelerate the standard 1959 Ford 6, by almost 2 sec to 60 mph to be specific. As is our usual practice, we made our stop watch and Tapley checks on the stick-shift model, plus a few spot checks on the automatic transmission car. As expected, the stick-shift gives better times from a standstill, but the torque converter gives slightly better high-gear Tapley readings and better acceleration in the 50/65-mph range. There was no opportunity to test for top speed or for fuel consumption. Accordingly, the figures given in our data panel for these tests are those supplied by the manufacturer. We believe them to be quite accurate, even conservative. The time for a standing ¼ mile is our estimate—no ¼ mile was laid out anywhere on the test track, and the company wasn't about to let us take the car off the grounds.

To our minds the Falcon has two outstanding features. The first is the engine. It is smooth, quiet and has extraordinarily good torque. Considering its low numerical axle ratio (3.10:1), the low-speed pulling power and acceleration through the gears are even more unusual.

Upper suspension mounts are braced to cowl for rigidity.



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What's more, the engine will rev surprisingly well. An indicated speed of 65 mph in 2nd gear, still not the limit, is an actual 62 mph at 5050 rpm. Undoubtedly the engine will go beyond that, but we didn't try it. At any rate, the well rounded engine performance characteristics and typical Ford shift linkage (good) are responsible for the excellent acceleration figures given in the data panel.

The second outstanding feature of the Falcon is in the ride and handling departments. It isn't hard to get good handling in a compact car, but it is extremely difficult to combine handling with a good ride. The Falcon has both to a superlative degree, though we would rate the ride a little the better of the two, primarily because the steering is slower than need be. Nevertheless the steering feels right, and the car is much easier to maneuver and control than the large Fords with which so many Americans are familiar. There is understeer, of course, and a fast bend takes a little pressure on the wheel to hold it—but it's nothing like one of our larger cars. It's definitely a step in the right direction, even if it isn't a sports car.

Reverting to the technical aspects of the Falcon, perhaps the most interesting story is that of its curb weight. From the very beginning the car was conceived as a full 6-passenger model and, for performance and economy reasons, the weight goal was set at 2400 lb. The final production curb weight with no accessories is 2382 lb, and anyone who has ever worked on this end of the business, in either the automotive or aircraft industry, will

Falcon interior is not totally unlike other Ford cars.



realize what a feat of design engineering this unusually close adherence to the original weight specifications represents.

Naturally, the unit body/frame construction is partly responsible for meeting the weight goal. However, the engine weight is even more interesting. Ford's big 6 weighs 525 lb complete with flywheel, but without clutch. Engine weight does not go down directly with reduction in piston displacement; therefore the Falcon's corresponding weight of 345.5 lb is truly remarkable, particularly since the pistons are the only major parts made of aluminum. This low weight was possible in the "all-iron" engine because of some very careful design and some new approaches to foundry practices. Three illustrations should suffice: weight was saved by splitting the crankcase at the main bearing centerline, by eliminating the usual ohv side cover plate and by casting the intake manifold integral with (but external to) the head. Of course, the ultra-short stroke (2.50 in.) saves weight too; connecting rods, for example, are only 4.855 in. long, center to center. On the other hand the 4-main-bearing crankshaft is not light; it has 2.248-in. mains and 2.123-in. crankpins. Valve timing, incidentally, is a conservative 15-37-45-7 sequence.

The clutch is non-centrifugal and has an 8.5-in. diameter. The 3-speed transmission is conventional and smaller than the standard Ford's. The optional automatic transmission has some parts from the larger Ford's, but the 3-element torque converter is smaller. It has a low-gear ratio of 1.75 and a converter multiplication of 2.40. No rear-axle ratio options are listed. The axle is a special hypoid unit of high-offset type (1.75 in.) with a 6.75-in.-diameter ring gear.

Front suspension is the now conventional ball type with 35% anti-dive and the roll center raised 2.5 in. above the ground. However, the coil spring is located above the upper wishbone. Ride rate is 80 lb/in. in front, with 90 lb/in. at the rear via conventional leaf springs. An anti-roll bar is fitted in front.

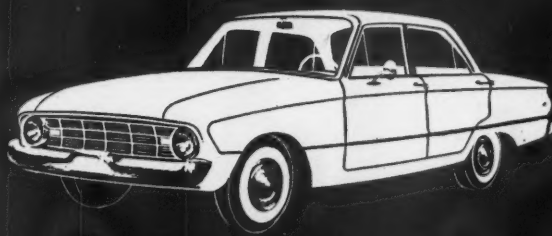
The car will be offered in either a 2-door or a 4-door sedan. Hip room front and rear, for both, is 57.1 in. Effective leg room is 44.6 in. front and 40.1 in. rear, and the trunk volume is 24.5 cu ft.

In summation the Falcon is a car which will not only delight the millions of Ford proponents but will give them sensible, economical motoring. As Henry Ford II said recently, "The economic impact and the interest value of such a development [the Falcon and competitive entries of other manufacturers] could well be comparable in significance to the appearance of the Model T and Model A on the American scene."

Simplicity is beauty but with strong personal identity.



ROAD & TRACK ROAD TEST 225



FORD FALCON

SPECIFICATIONS

List price	n.a.
Curb weight	2375
Test weight	2700
distribution, %	52/48
Dimensions, length	181.1
width	70.0
height	54.5
Wheelbase	109.5
Tread, f and r	55/54.5
Tire size	6.00-13
Brake lining area	114
Steering, turns	4.6
turning circle, ft	37.7
Engine type	6 cyl, ohv
Bore & stroke	3.50 x 2.50
Displacement, cu in.	144.3
cc	2366
Compression ratio	8.70
Bhp @ rpm	85 @ 4000
equivalent mph	86
Torque, lb-ft.	138 @ 2000
equivalent mph	43

PERFORMANCE

Top speed (mf), mph	87
best timed run	n.a.
3rd ()	
2nd (5050)	62
1st (5050)	33

FUEL CONSUMPTION

Normal range, mpg	25/30
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ACCELERATION

0-30 mph, sec	4.8
0-40 mph	8.3
0-50 mph	12.8
0-60 mph	17.7
0-70 mph	25.5
0-80 mph	36.5
0-90 mph	
0-100 mph	
Standing 1/4 mile (est)	20.8
speed at end, mph	64

GEAR RATIOS

O/d (n.a.), overall	
4th (n.a.)	
3rd (1.00)	3.10
2nd (1.75)	5.43
1st (3.29)	10.2

TAPLEY DATA

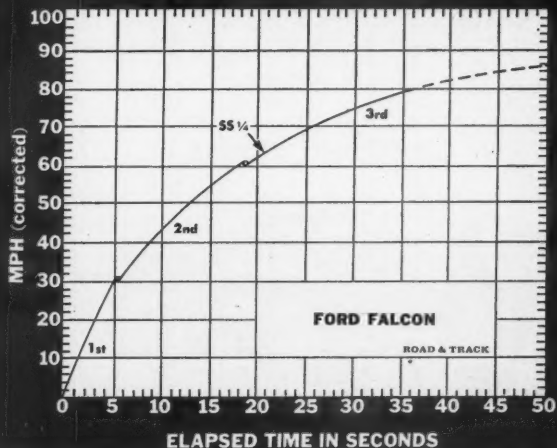
4th, lb/ton @ mph	@
3rd	200 @ 40
2nd	350 @ 35
1st	530 @ 22
Total drag at 60 mph, lb	135

CALCULATED DATA

Lb/hp (test wt)	31.8
Cu ft/ton mile	86.0
Mph/1000 rpm (3rd)	21.6
Engine revs/mile	2780
Piston travel, ft/mile	1155
Rpm @ 2500 ft/min	6000
equivalent mph	129
R&T wear index	32.2

SPEEDOMETER ERROR

30 mph	actual 29.1
40 mph	38.8
50 mph	48.5
60 mph	58.2
70 mph	67.9
80 mph	77.6
90 mph	
100 mph	





MASERATI 3500 GT

Tense but tractable, for touring or taxiing

THE MASERATI GRAN TURISMO COUPE, still a rare bird in California, caused much excitement when it arrived in front of our offices. Owner Bob Allinger of Allinger Motors, Palo Alto, had offered the car for a road test, and the chance to drive a real-life dream car is a rare one.

The first impression is one of surprise at the car's size. It is unusually large for an Italian sports car and, as we later discovered, unusually heavy. The demonstrator was

dark blue, a color which doesn't do a great deal for this model, but then all Italian cars are not necessarily painted red. The body quite naturally is by Touring, and has a superb finish.

The interior is equally impressive. The test car had leather upholstery, apparently pigskin, but in a reddish-brown color. The two semi-bucket seats are low, but not so close to the floor as in some sports cars. Behind them

The trident decorates as impressive a snout as any today.



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A pigskin throne for a long-armed ruler of the highway.



PHOTOS BY POOLE

is a small bench seat which looks large enough for two—providing they have no legs. Moving the front seats forward results in only a minimum of leg room for potential rear passengers.

As usual in Italian cars, the steering wheel is placed well forward. The full complement of instruments looks custom made, not like the occasional war surplus offering.

Under the hood is an in-line 6 with block and head of cast aluminum. The double overhead camshafts make it look big and powerful, and with 230 bhp it is all of that.

Starting the engine produces a huge truck-like sound: at an idling speed of only 500 rpm the deep, awesome rumble is accompanied with a certain amount of clatter, something like the loose tappets of an old Chevrolet.

The clutch is a little heavy, but getting off the mark properly requires no finesse or experience. The instant the car moved off all rumble and clatter vanished and we discarded our reservations about the powerplant. The engine does not have American V-8 smoothness and silence but is entirely adequate in this respect. Only when really extended does it become at all noticeable, and even then the sound is more a power roar than a complaint. Any cruising speed up to 100 mph can be maintained comfortably, with the wind making more noise than the engine.

We have long felt that the Maserati (along with its compatriot, Ferrari) is a little too noisy and fussy for genteel use; now we are going to have to eat our words (Miscellaneous Ramblings, October) about this GT version. Our test car had just over 5000 miles on the odometer and the owner swore it was right off the boat—untouched in any way. Aside from an occasional tendency to stall at idle, it seemed to be in good tune.

For all its size and weight, the Maserati is very easy to drive, one of its best features being an excellent gearbox by ZF. All gears are quiet and are synchronized via the usual cones. If you really stand on it, first gear gives a truly magnificent burst of acceleration, albeit a trifle noisy. Using the short, floor-mounted shift lever is sheer pleasure. If you want to storm, you must use the gearbox; if you feel lazy, high gear is comfortable as low as 20 mph (850 rpm).

Acceleration in high from that speed is smooth and brilliant, though peak torque is not reached until 105 mph. High gear does feel best from about 2500 rpm up, and our best Tapley reading was obtained at that speed (59 mph). The Tapley meter (continued on page 96)

A dohc, in-line 6, impressive to look at or listen to.

ROAD & TRACK ROAD TEST 226



MASERATI G.T. COUPE

SPECIFICATIONS

List price	.....	\$10,500
Curb weight	.....	3180
Test weight	.....	3530
distribution, %	.....	49/51
Dimensions, length	.....	185
width	.....	63.7
height	.....	51.2
Wheelbase	.....	102.2
Tread, f and r	.....	54.7/53.5
Tire size	.....	6.70-16
Brake lining area	.....	219
Steering, turns	.....	4.2
turning circle, ft.	.....	34.2
Engine type	.....	6 cyl, dohc
Bore & stroke	.....	3.39 x 3.94
Displacement, cu in.	.....	212.6
cc	.....	3485
Compression ratio	.....	8.20
Bhp @ rpm	.....	230 @ 5500
equivalent mph	.....	129
Torque, lb-ft	.....	224 @ 4500
equivalent mph	.....	105

PERFORMANCE

Top speed (4th), mph	.....	129
best timed run	.....	n.a.
3rd (5500)	99
2nd (5500)	70
1st (5500)	43

FUEL CONSUMPTION

Normal range, mpg	15/20
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ACCELERATION

0-30 mph, sec	2.9
0-40 mph	4.0
0-50 mph	6.2
0-60 mph	7.5
0-70 mph	10.1
0-80 mph	13.2
0-90 mph	.....	16.8
0-100 mph	.....	22.5
Standing 1/4 mile	.....	15.5
speed at end, mph	.....	87

GEAR RATIOS

O/d (n.a.), overall	.....
4th (1.00)	.....	3.54
3rd (1.30)	.....	4.60
2nd (1.84)	.....	6.51
1st (3.00)	.....	10.6

TAPLEY DATA

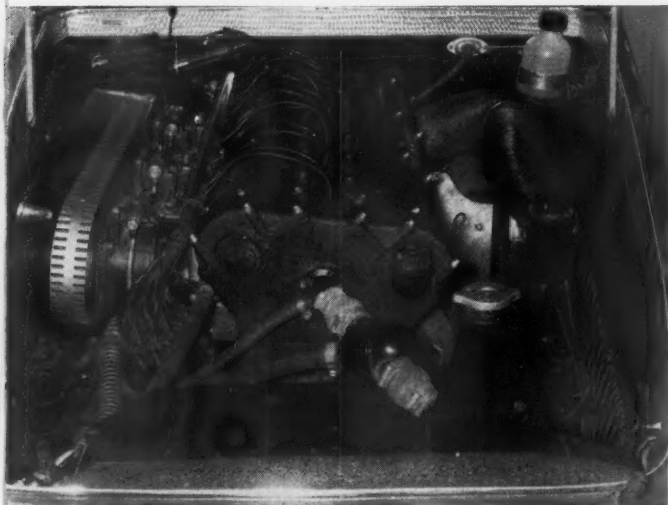
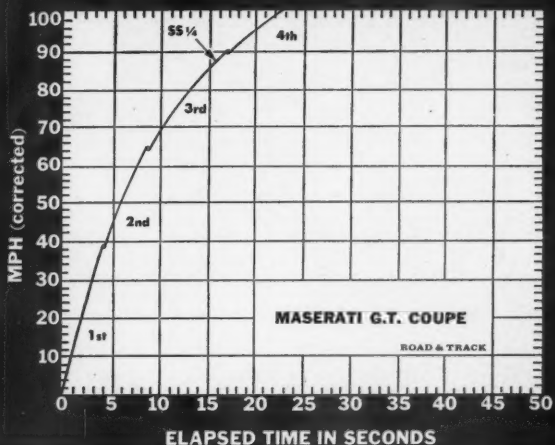
4th, lb/ton @ mph	.....	250 @ 59
3rd	.....	325 @ 63
2nd	.....	460 @ 51
1st	.....	off scale
Total drag at 60 mph, lb	.....	176

CALCULATED DATA

Lb/hp (test wt)	.....	15.4
Cu ft/ton mile	.....	89.6
Mph/1000 rpm (4th)	.....	23.4
Engine revs/mile	.....	2565
Piston travel, ft/mile	.....	1685
Rpm @ 2500 ft/min	.....	3810
equivalent mph	.....	89.1
R & T wear index	.....	43.2

SPEEDOMETER ERROR

30 mph	.....	actual 28.9
40 mph	.....	37.7
50 mph	.....	47.3
60 mph	.....	56.1
70 mph	.....	65.0
80 mph	.....	73.4
90 mph	.....	81.9
100 mph	.....	90.4



road test



NSU PRINZ

Tiny but terrific, the NSU is indeed a "Prince"

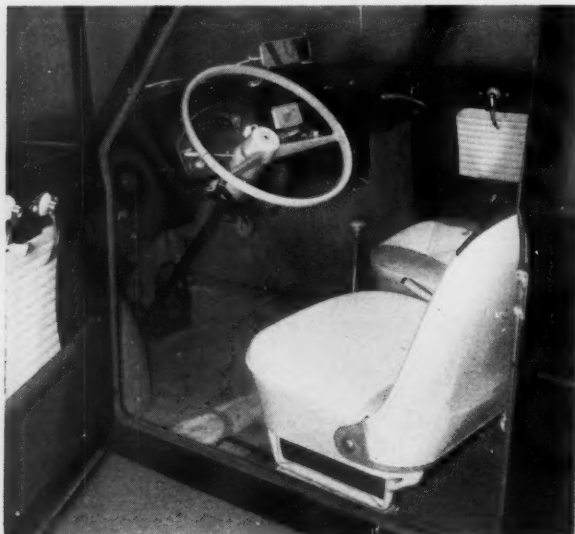
FROM THE AMAZING success of American Motors' Rambler in a sales year that brought down giants and humbled the mighty, we may reasonably conclude that an upper limit has been reached for the over-all dimensions of an automobile. There is a spreading awareness that the compact car is easier to park and burns much less fuel, which makes the still current advertising philosophy of "bigger is better" sound just a little hollow. Mr. Average American is overcoming a long-time tendency to "think

big" and there is every indication that he will very soon demand that his transportation package be smaller. This switch in thinking raises a real poser for the planners of tomorrow's automobiles. How small is "smaller" going to be?

This road test is concerned with the NSU Prinz, which must surely be one of if not *the* smallest "real" automobiles made today. There are even smaller motor vehicles, but we hesitate at gracing them with the title of "car."

The NSU Werke at Neckarsulm, Germany, is a new-

The interior, a close but not uncomfortable fit.



The luggage locker is definitely "cozy."



PHOTOS BY POOLE

comer to the automotive field, but it has been producing a line of sporting and utilitarian motorcycles for many years. The motorcycle influence is therefore much in evidence throughout the Prinz, especially in the engine design.

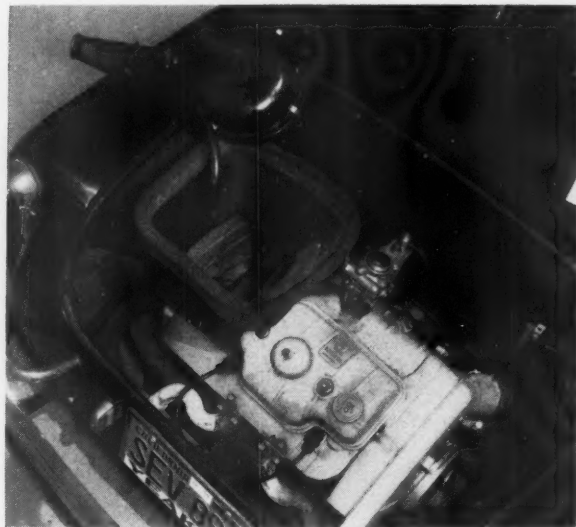
One's first impression of the NSU Prinz will depend a great deal upon whether the car is viewed coming or going. Styling such a small package is admittedly a difficult chore, but it could have been carried off much more gracefully than in the case with the Prinz. From the front, the NSU isn't at all bad; a bit narrow, perhaps, but the over-all effect is quite good. Approached from the rear, though, the sides of the car appear to lean inward at an angle and the combination of slope and body contours makes the car look distorted.

As far as quality is concerned, the NSU makes a much better impression. In all too many of the mini-cars, there is a depressing feeling of cheapness. Though we have never been eager to criticize the Spartan look, the few extra appointments allowed by cost considerations should be first rate. This is, for the most part, the case with the Prinz; even though it must definitely be classed as stark, what small trim there is appears to be well above the minimum in quality.

Taken strictly as a mechanism, the NSU Prinz is one of the most fascinating packages that we have come across in a very long time. Passenger weight is not a terribly important factor in a larger vehicle, but in the mini-car, where four people can add from 50 to 75% of the car's unladen weight, the positioning of the passenger load can affect handling to an overwhelming extent. The NSU has its seating arranged in such a way that balance improves as the car is loaded to capacity. With four average people inside, one 70-lb piece of luggage in the forward compartment and 20 lb of miscellany behind the back seat, the Prinz achieves a 50/50 balance.

The suspension is of conventional configuration, but somewhat unorthodox in construction. At the front there are the usual unequal length A arms and coil springs enclosing telescopic shock dampers, all of which would be ordinary enough were they not fastened to a tubular member that is removable from the chassis. This tube is bent upward at either end to form a spring perch and a mounting post for the upper A arm. Unlike many cars, which have the entire front suspension liberally sprinkled with grease fittings, the NSU has only two on the entire car. The steering spindles, which must take considerable rotation as the steering is swung from lock to lock, each have one grease nipple. All of the suspension pivots are on

The engine, with the aircleaner removed.



ROAD & TRACK ROAD TEST 227



NSU PRINZ (34 HP)

SPECIFICATIONS

List price.....	\$1495
Curb weight.....	1100
Test weight.....	1400
distribution, %.....	50/50
Dimensions, length.....	124
width.....	55.9
height.....	53.2
Wheelbase.....	78.7
Tread, f and r.....	47.2
Tire size.....	4.40-12
Brake lining area.....	64.5
Steering, turns.....	2.4
turning circle, ft.....	28.2
Engine type.....	2 cyl, sohc
Bore & stroke.....	2.95 x 2.60
Displacement, cu in.....	35.6
cc.....	583
Compression ratio.....	7.50
Bhp @ rpm.....	34 @ 5800
equivalent mph.....	77.0
Torque, lb-ft.....	30.4 @ 3000
equivalent mph.....	39.8

GEAR RATIOS

O/d (n.a.), overall.....	
4th (1.00).....	4.52
3rd (1.41).....	6.37
2nd (2.21).....	10.0
1st (4.14).....	18.7

CALCULATED DATA

Lb/hp (test wt).....	41.2
Cu ft/ton mile.....	66.5
Mph/1000 rpm (4th).....	13.3
Engine revs/mile.....	4520
Piston travel, ft/mile.....	1960
Rpm @ 2500 ft/min.....	5775
equivalent mph.....	76.6
R&T wear index.....	88.6

PERFORMANCE

Top speed (4th), mph.....	70.4
best timed run.....	72.5
3rd (6400).....	60
2nd (6500).....	39
1st (6500).....	21

FUEL CONSUMPTION

Normal range, mpg.....	35.50
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ACCELERATION

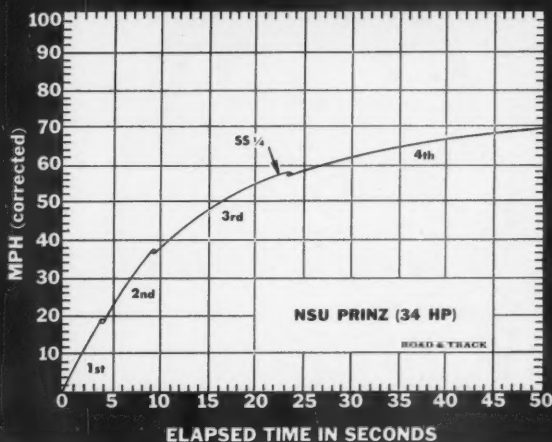
0-30 mph, sec.....	6.3
0-40 mph.....	10.3
0-50 mph.....	16.5
0-60 mph.....	26.5
0-70 mph.....	58.0
0-80 mph.....	
0-90 mph.....	
0-100 mph.....	
Standing 1/4 mile.....	22.5
speed at end, mph.....	58.0

TAPLEY DATA

4th, lb/ton @ mph.....	175 @ 42
3rd.....	250 @ 35
2nd.....	390 @ 28
1st.....	480 @ 20
Total drag at 60 mph, lb.....	77

SPEEDOMETER ERROR

30 mph.....	actual 27.0
40 mph.....	36.5
50 mph.....	46.0
60 mph.....	55.2
70 mph.....	64.2
80 mph.....	72.5
90 mph.....	
100 mph.....	



rubber bushings, which are said (by NSU) never to require attention.

The rear suspension, to all purposes and intent, is a swing axle not unlike that used by Volkswagen or Fiat. Where it differs is in the pivot axis, which is parallel to the chassis centerline instead of being diagonal as on the other two. The rear wheels are carried by swinging arms made of tubing formed into a wide-angle V with the point holding the hubs and the two arms of the V leading to pivots on the chassis.

There is no frame, as such, under the Prinz. It has the unitized chassis/body type of construction that, as a means of getting low total weights and rattle-free service, knows no peer. Driving the NSU bears out this contention; there are no rattles inside. Quite a lot of engine noise is present—and in a most peculiar form. A combination of sounds from the engine, its cooling blower and the transmission makes a noise just like a taxiing F-100 jet. We spent the first hour or so of driving looking nervously into the rear-view mirror to see if some fighter pilot was trundling his plane along behind us.

In handling, the NSU Prinz is neither very good nor very bad but had a sort of indefinite feel that is just a trifle unsettling. The rack-and-pinion-type steering is far too sensitive for most people; it can be grand fun while twitching the car around tight corners, but for 60-70 mph cruising it's definitely skittery.


Aside from the sudden steering, the controls are a real delight, although the pedals are quite close together as on all very small cars. Colored lights take the place (in theory at least) of gauges, and the only thing one must "read" is the speedometer. One long lever protrudes from each side of the steering column, just in front of the wheel. On the left is a noncanceling turn indicator, and on the right a handy little wobble-stick that serves as a dimmer switch. Aside from this basic function, it also sounds the horn (when pulled back) and can be used to flash a warning with the headlights by just pulling down. The starter is one of those Dynastart things that serves as both generator and starter; it is actuated in the usual manner with the last position on the ignition switch. If you have never driven a car with a Dynastart, you really should give it a try. Just crank the key over and the engine whirls until it is running.

Engine, transmission and final drive are built into a single unit, with a common oil sump for all three. The engine is mounted transversely behind the rear axle and all power transmission is through straight spur-gears.

The Prinz's engine is based on the NSU "Max" motor-cycle engine, which displaces 250 cc and develops 20 bhp from its single cylinder. To make the Prinz engine, NSU has simply doubled the Max—plus a little displacement and less a few horsepower. Actually, there are several major differences but the basic sohc engine with inclined valves and hemispherical combustion chambers is all there. Two stages of tune are offered with 24 and 34 bhp; our test car had the more potent of the two engines.

Some of the basic features of the Max engine had to be dropped when the Prinz power unit was designed. The all-light alloy construction had to be compromised with the use of iron cylinders and the spark plugs were moved from the straight-in position on the single cylinder unit to a less ideal, but absolutely necessary, angled location. The built-up crankshaft with all-roller-type bearings was discarded in favor of a one-piece shaft running in two plain metal bearings with connecting-rod journals of the same type. For the same reasons of economy and convenience, the hairpin-type valve springs used on the Max have given way to conventional coils.

An unorthodox but quite workable method of driving the camshaft is used and is probably the most outstanding single item (technically speaking) on the car. Instead of the usual gear train, chain drive or combination of bevel gears and towershaft, there is a pair of eccentric-driven connecting rods. From the 2 gears necessary for the 2:1 "4-cycle" timing drive, a pair of eccentrics—spaced about 90° apart—drives a set of connecting rods in a semi-rotary and push-pull motion. These connecting rods lead up the side of the engine to another pair of eccentrics at the camshaft. The function of this second set of eccentrics is, of course, to transfer the rotating, push-pull motion back into pure rotation. A system very similar to this was used on some of the old Bentleys, but the Bentley design was more complicated and distinctly inferior.

Taking everything into consideration, the NSU Prinz is clearly the best designed of all the mini-cars. Unfortunately, although it is the best of its class, we can't imagine very many people wanting a car as small as the Prinz. Only the dedicated mini-car enthusiast would enjoy driving the Prinz for any long distance; for the rest of us, the novelty would soon begin to pall. The only widespread use for the Prinz that we can foresee in the U.S. is for the urban housewife, who should find it most satisfactory for short shopping trips. However, the Prinz has at least one saving grace—enough performance to keep up with the big boys. It scoots along right well! 

Well proportioned from the front. . . .



At least the visibility is good.

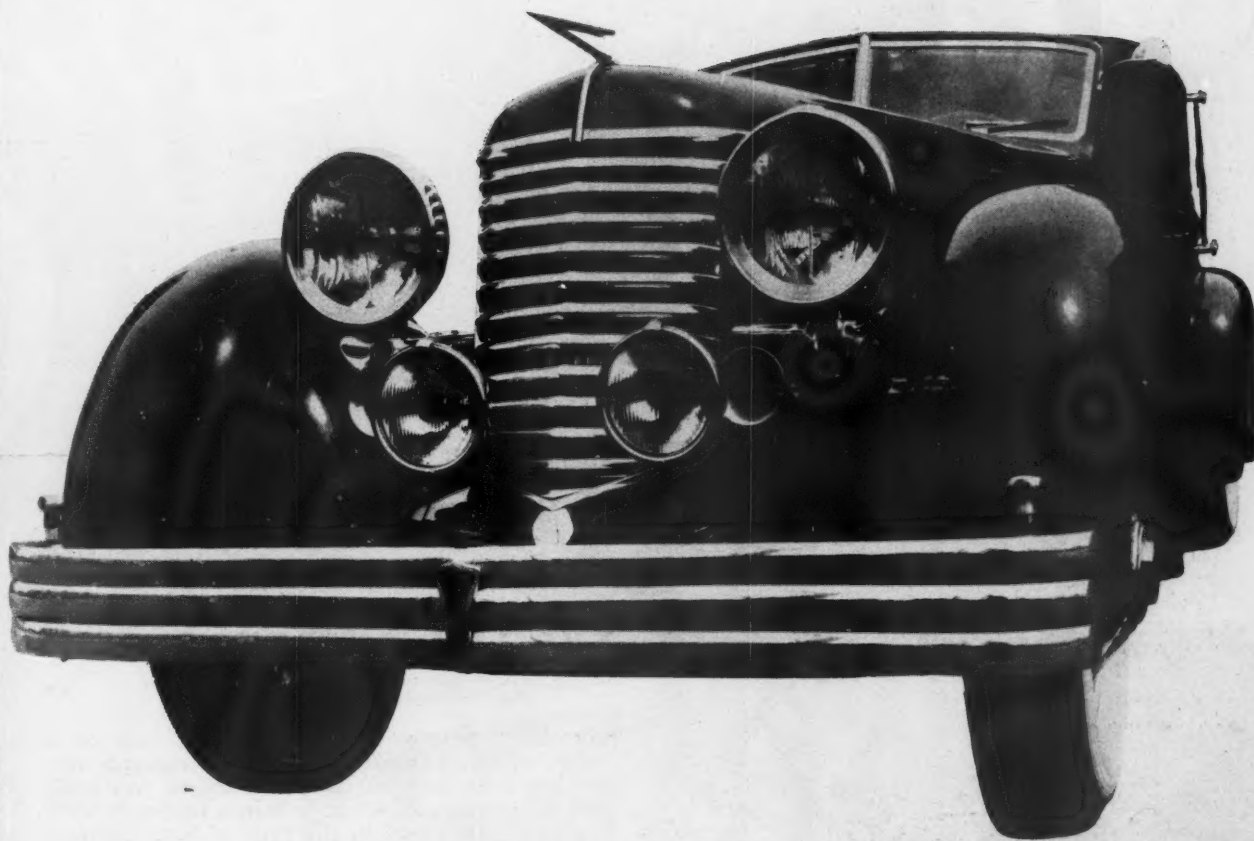


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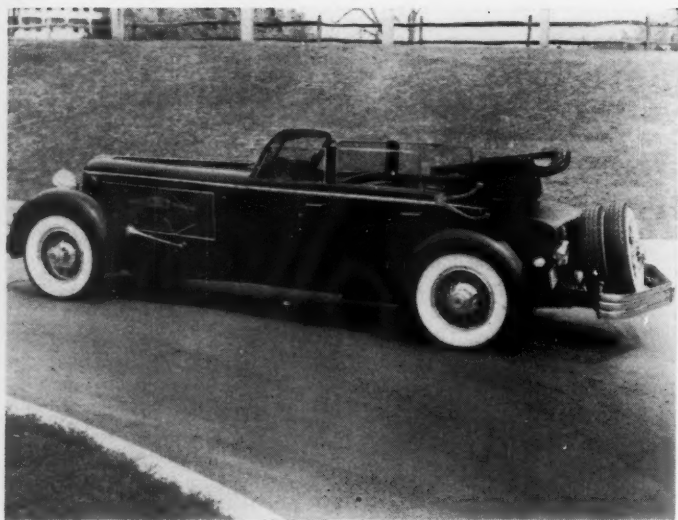
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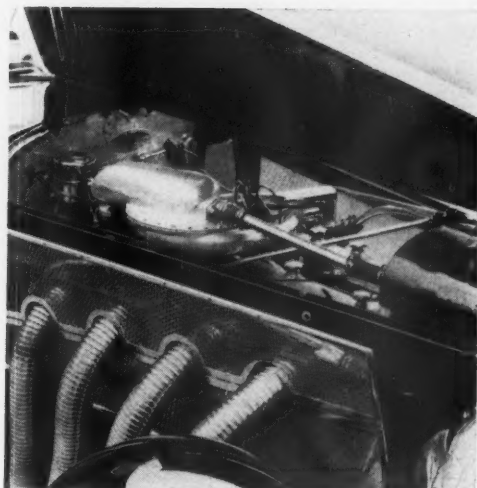
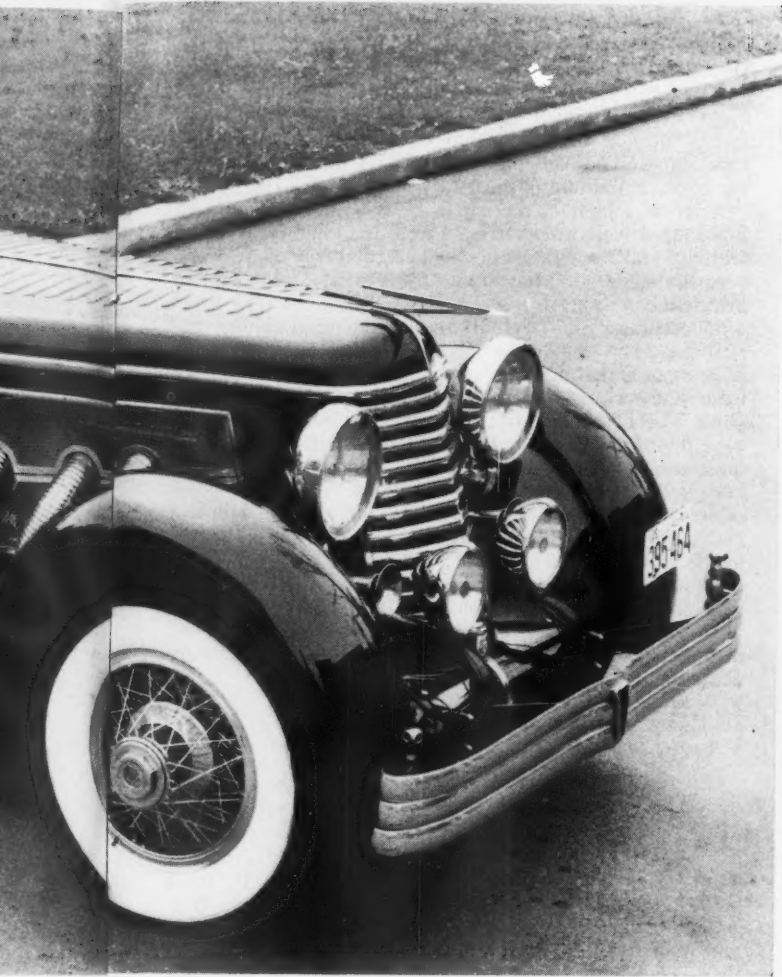
THE 1938 DUESENBERG S-J

THIS 1938 DUESENBERG S-J is the last issue of an honored breed. Originally ordered in Germany by non-objective artist Rudolph Bauer, the chassis was finally built in the company's Chicago branch factory in 1938. The car is now owned by Bill Pettit of Natural Bridge, Va., and exhibited in his Museum of Motoring Memories.

The coachwork, designed by Bauer himself, was first intended for execution by Erdmann and Rossi of Berlin-Charlottenberg, but was actually undertaken by Rollson of New York. It was finished in 1940, three years after Duesenberg went out of business, thus becoming the last of their cars ever completed.

Rollson's original bill for coachwork came to \$9043 and contained several noteworthy items: the special Marchal headlights, which cost \$235; three black leather suitcases (custom made to fit the black leather trunk) at \$225, and side screens for the hood, which listed at \$175.

The body of the car is in excellent condition and car-



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PHOTOS BY OZZIE LYONS

ries its superb appointments with authority. Violet is the color used throughout the interior—in the leather upholstery of both front and rear compartments, in the head lining, in the carpets, in the leather door paneling—and the turn indicator lens even repeats the color outside. The rear compartment has a sunken center section in the floor which contains two carpeted hassocks, also violet.

The rear compartment is separated from the front by the usual glass partition. A tasteful arrangement of ashtray, lighter and radio control lies before the rear passengers, as well as a buzzer with which one may genteelly alert the chauffeur.

At the disposition of the driver are all the gauges standard on a J (including an altimeter-barometer and a 150-mph speedometer), plus a pushbutton starter, cigarette lighter, turn indicator lights, twin ashtrays and a number of extra light switches. The dash lights number four, instead of the usual two. Tinted sun visors are made of glass, and are adjustable to almost any position. Full rear vision is assured by three mirrors, two of them mounted inside. A deep pocket is provided in each front door and in each kick panel, and most of the original tools are still under the front seat. A special air horn is supplied by a compressor mounted at the right front of the engine, powered by a pulley on the end of the lower horizontal shaft of the supercharger. A foot control operates the horn.

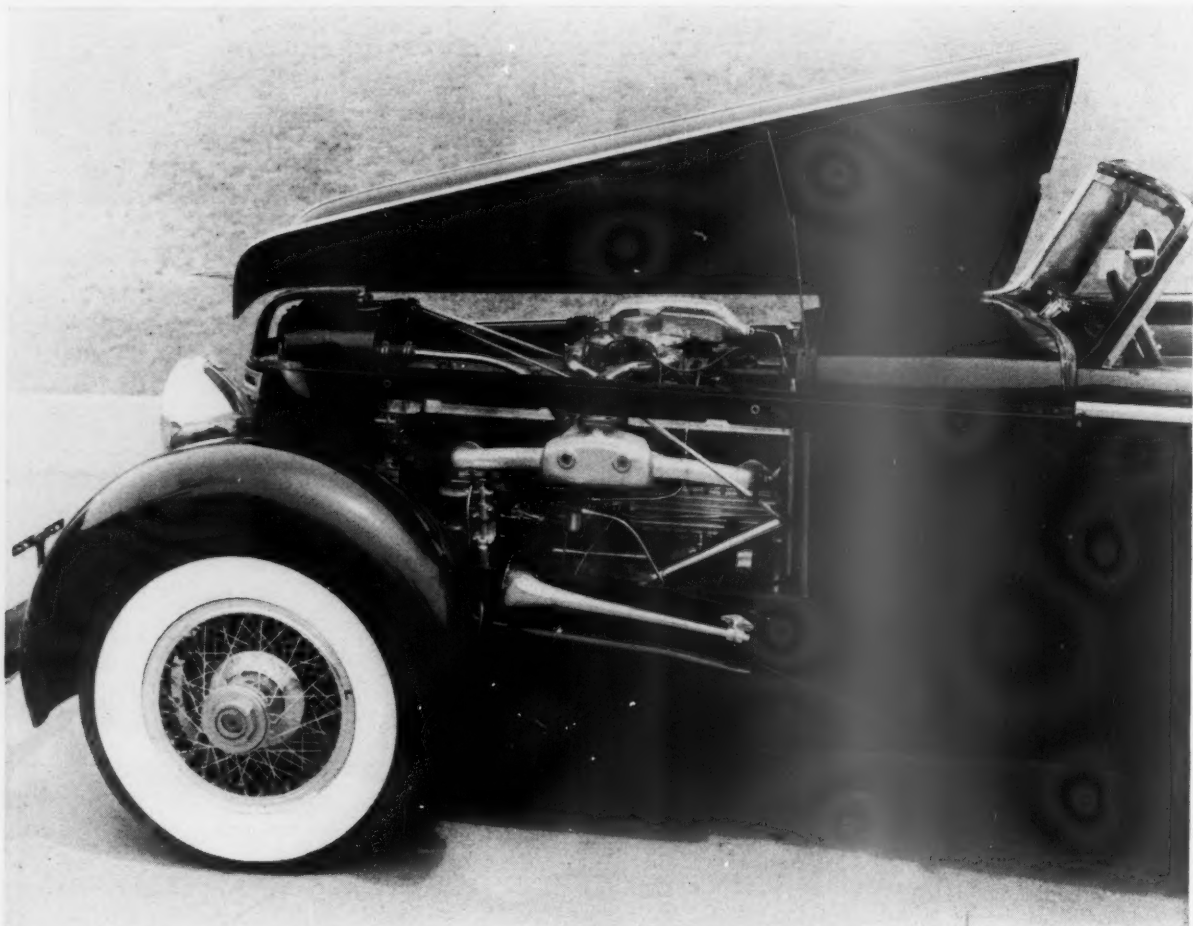
The body design is unusual even for a Duesenberg. A horizontal-barred, false V-grille hides the standard verti-

cal radiator shutters. The bumpers carry three bars instead of the standard two and depart entirely from the Duesenberg double bow. The simplified hood spear is extra large. The most apparent design departure is the cycle fenders, which blend surprisingly well into this formal design. Craftsmanship of the top is, of course, excellent, and conversion of the rear portion requires only the barest minimum of effort.

Over-all length of the car is 20 ft 7 in. The standard S-J long-wheelbase chassis, 153.5 in. long, sold for a sturdy \$11,750 without body. The total bill of \$20,793 is rather staggering, but it paid for a great deal of almost priceless craftsmanship and prestige.

Duesenberg's mighty 320-hp supercharged engine carried the 1938 S-J to an advertised 130 mph, certainly adequate for the highways of its time or any other period. Complete technical data appear in the panel on the next page. The customary muffler bypass is intact, and must have had an all but lethal effect when called upon to vanquish lesser motorists of the day. But the last Duesenberg ever sold is silent today, for want of a radiator. The odometer total stands at only 10,368 miles, little over the break-in figure for an S-J but a strong contributing factor to the superb condition of our Salon car.

In its only showing outside the museum, the Pettit car was entered at the annual Old Dominion Meet at Waynesboro, Va., this spring. It not only scored first among the classics; it went on to take a trophy as Most Outstanding Car—at an antique car meet!



1938 DUESENBERG S-J

Ed. Note: This test report is based on familiarity with (but not ownership of) two cars, neither supercharged. The performance figures, therefore, are estimates but based on considerable experience in this area, plus correlation of a few published claims which appear possible though not too probable. Our classic test No. 4, on a J coupe, appeared in November 1956.

AUGUST 1940: Ever since our test on the fabulous Model J Duesenberg coupe a few years ago, we have been besieged by readers asking that we test the even more potent supercharged version, the S-J. Unfortunately, no such opportunity ever came our way—until recently.

The subject of this test is a long-wheelbase chassis. Despite the extra power of its supercharged engine, it has two strikes against it: 1) the test weight is 900 lb more, and 2) the axle ratio is 4.22:1, as against 3.80 in the earlier test coupe. The net result is that this car falls slightly below the performance of the earlier, lighter model both in acceleration and in maximum speeds.

The top speed, for example, is no better than 106 mph, 10 miles slower than the unsupercharged J of 1930. Even 106 mph meant turning the engine well beyond its power peak, actually 4600 rpm. Furthermore, the published claims of 129–130 mph could never be attained with any coachwork of normal frontal area, for the simple reason that 20% more bhp is not nearly enough to do the job (power required goes up as the *cube* of speed). Another claim which may have been true once can no longer be credited: the attainment of 102 mph in 2nd gear. Such a performance was possible at 5200 rpm when the transmission had the early-type gears, which gave a ratio of 1.29 in 2nd. Our test car (one of the last assembled in 1938) had a 1.42 2nd gear and could conceivably reach 85 mph at 5200 rpm in 2nd, but no one in his right mind would ever try it on such an expensive engine with such a long stroke (5200 rpm is equivalent to a piston speed of 4110 fpm, astronomical for such big reciprocating parts).

However, disillusionments aside, let there be no mistake about the performance of this magnificent machine: it goes exceedingly well, and its actual time of 22.5 sec from 0–100 mph is only one half-second short of the advertising claims. Without a doubt, there are well tuned S-J's with light bodies which can do the same test in under 20 sec. We doubt if any catalogued car from anywhere can even come close to the fantastic abilities of the S-J Duesenberg. We have no official record of the lap times made a few years ago by the Big J entered at Le Mans by Prince Nicholas of Rumania, but they probably were not too competitive in view of the big Duesenberg's unwieldiness.

On this latter point, the sheer size and weight of the Duesenberg makes it more than a handful for most of us. It requires meticulous attention at the front (wheel balance and alignment) to get good road holding at speed, and even then the front end is prone to shimmy and tramp at over 80 mph on certain types of pavement. Steering is very good from 20–75 mph, and extremely heavy at low speeds. The ride is good by 1930–1933 standards but far below what one gets today in even the "popular" cars, thanks to modern i.f.s. About the best we can say about driving this creation is that the clutch, brakes and gear lever work easily and well. An experienced driver will love the car on the highway and tolerate it in the city.

In spite of our debunking attitude, the Duesenberg is (or was) one of the greatest classics ever built. It has already become history, and it is sadly doubtful if we shall ever again see a car built to such a high ideal as the Big J. It is also sad (to us) that the beautiful Duesenberg radiator could have been so desecrated.

ROAD & TRACK CLASSIC TEST 30



DUESENBERG-SJ

SPECIFICATIONS

List price.....	\$20,793
Curb weight.....	6400
Test weight.....	6800
distribution, %.....	49.5T
Dimensions, length.....	246
width.....	74
height.....	70
Wheelbase.....	153.5
Tread, f and r.....	60.0
Tire size.....	7.00-19
Brake lining area.....	n.a.
Steering, turns.....	3.5
turning circle, ft.....	50
Engine type.....	8 cyl, dohc
Bore & stroke.....	3.75 x 4.75
Displacement, cu in.....	420
cc.....	6885
Compression ratio.....	5.72
Bhp @ rpm.....	320 @ 4200
equivalent mph.....	97.0
Torque, lb-ft (est).....	425 @ 2400
equivalent mph.....	55.4

GEAR RATIOS

O. d (n.a.), overall.....	
4th (n.a.).....	
3rd (1.00).....	4.22
2nd (1.42).....	6.00
1st (2.48).....	10.5

CALCULATED DATA

Lb/hp (test wt).....	21.2
Cu ft/ton mile.....	92.9
Mph/1000 rpm (3rd).....	23.1
Engine revs/mile.....	2600
Piston travel, ft/mile.....	2060
Rpm @ 2500 ft/min.....	3160
equivalent mph.....	73.0
R&T wear index.....	53.5

PERFORMANCE

Top speed (3rd), mph.....	106
best timed run.....	n.a.
3rd ().....	
2nd (5200).....	85
1st (5150).....	48

FUEL CONSUMPTION

Normal range, mpg.....	7.14
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ACCELERATION

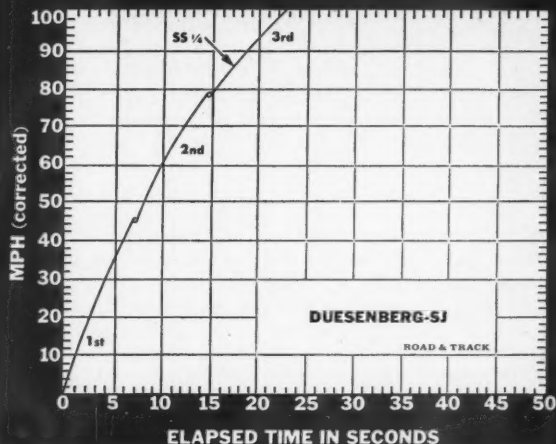
0-30 mph, sec.....	3.9
0-40 mph.....	5.8
0-50 mph.....	7.9
0-60 mph.....	9.8
0-70 mph.....	12.0
0-80 mph.....	14.7
0-90 mph.....	18.3
0-100 mph.....	22.5
Standing ¼ mile.....	16.8
speed at end, mph.....	87

TAPLEY DATA

4th, lb/ton @ mph.....	@
3rd.....	340 @ 55
2nd.....	480 @ 40
1st.....	off scale
Total drag at 60 mph, lb.....	270


SPEEDOMETER ERROR

30 mph.....	actual n.a.
40 mph.....	
50 mph.....	
60 mph.....	
70 mph.....	
80 mph.....	
90 mph.....	
100 mph.....	



NEW FROM EUROPE

*Modifications to gladden the heart and eye,
and luxury to satisfy the most critical*


 DAIMLER-BENZ, always busy with improvements to the Mercedes cars, introduced a new line of 220 models this month. Although few changes were made, they add to the excellent quality and road holding for which this marque is famous.

The models are designated the 220, 220-S and 220-SE; the 220 replaces the 219, which has been dropped, and the 220-S and SE replace last year's similar models. The three models look alike, with the exception of minor trim differences, and use the same chassis-body (unit body/frame construction), suspension and basic 6-cyl, sohc engine.

All three have a wheelbase of 108.2 in. and an overall length of 192.2 in., which makes them 7 in. longer than the 219 and 5 in. longer than the previous 220 series. The wheelbase, identical to the 219's, is 3 in. shorter than last year's 220's. Width on the new models is 70.6 in. and the curb weight is 2940 lb.

Our European representative, Bernard Cahier, was able to drive these new models through the courtesy of Artur Keser of Daimler-Benz. Cahier reports, "We took some acceleration figures from the speedometer, which was about 3% off. With the 105-bhp 220, we reached 50 mph in 9.1 sec, 62 mph in 15.5 sec and 75 mph in 21.5 sec. On the 124-bhp 220-S we reached 50 in 8.9 sec, 62 in 13.6 and 75 mph in 20.3 sec. The SE, which has Bosch intermittent fuel injection and is rated at 134 bhp, reached 50 in 8.5, 62 in 12.5 and 75 mph in 19 sec. Of all these cars we liked the 220-SE best because of its better flexibility and performance in all ranges, although I rate the 220 as a very good buy." Top speed of the 220-S and 220-SE is rated by the factory at 102 and 105 mph respectively.

Along with the entirely new line of 220 models, minor changes have been made in the 180, 190 and 190-D sedans. Minor face-lifting of the grille and bumpers is the most obvious on the outside, and the newly padded steering wheel distinguishes the interior. Horsepower of the 4-cyl engine has been raised to 78 on the 180 and 90 on the 190.

 ON THE FIRST DAY of October, when the Paris Auto Show opens, the largest Rolls-Royce that has ever been made will have its first public showing. Designated the Phantom V, the new model is designed to be chauffeur driven and is modestly claimed by its makers to have "every conceivable luxury for passenger comfort."

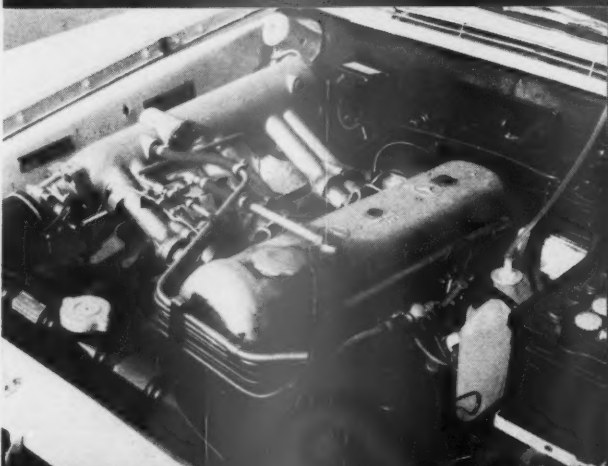
With automobile manufacturers all over the world reducing the size of their cars, Rolls-Royce has produced the Phantom V to provide a spacious, luxurious vehicle for those people in the modern business and political



Mercedes presents a slightly improved beauty.



Vulnerable headlights in a new setting.



Bosch fuel injectors supply 134-bhp Mercedes engine.

world who require such splendid surroundings when they transport important guests and executives. Also, the sheer lavishness of space in the Phantom V is likely to attract many individuals who have come to dislike, for reasons of advanced years or unyielding dignity, the task of bending double to squeeze into the increasingly squat depths of the modern automobile.

Just under 20 ft in length, the Phantom V must surely be one of the biggest cars ever made by anyone. Even so, the car is said to be much more agile than its 144-in. wheelbase would suggest. Although it is unlikely that any chauffeur is going to complain, power steering is fitted to insure happy labor-management relations.

The car exhibited at the Paris Show will have coachwork by James Young. A 7-passenger limousine by Park Ward and a touring limousine by H. J. Mulliner are the other bodies scheduled for the Phantom V chassis.

Available interior fittings include a cocktail cabinet, electrically operated windows and air conditioning. The woodwork used for trim is veneered with French figured walnut and the upholstery is done in "English hide" (a term which seems a bit ghoulish to us) or in "West of England cloth" (whatever that may be).


The engine, which is to be used in all of the three new models from Rolls-Royce Ltd., replaces the 6-cyl in-line unit which had been the mainstay of the Rolls-Royce line for several years. The Phantom III of the late Thirties was a V-12, and an in-line 8-cyl engine has been available on special order, but the new V-8 is the first 8-cyl unit in regular production.

With a bore of 4.1 in. and a stroke of 3.6 in., the new V-8 is a decidedly over-square design. Both the cylinder block and the cylinder head are cast of high-silicon-content aluminum alloy. Wet cylinder liners of cast iron, along with austenitic steel valve seats and valve guides of cast iron and bronze for the intake and exhaust valves respectively, provide the wear-resistant surfaces. Cast iron is also used for the camshaft but the crankshaft is made of chrome molybdenum steel. It runs in 5 main bearings.

Even though the new V-8 displaces 6230 cc (compared to 4566 cc for the 6) it is no heavier, due to the extensive use of light alloys in its construction. Total power was a secondary consideration in the designing of this engine; the main objectives were smoothness, quiet, and low-speed torque.

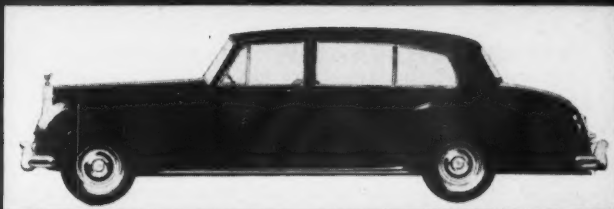
All three of the new models from Rolls-Royce and Bentley share the same engine, but the Silver Cloud II and the Bentley S-2 are on slightly smaller chassis (123-in. wheelbase). An automatic transmission (Hydramatic) is standard on all models and has a manual overriding control to give 4 usable forward speeds.

Although there are minor differences in the three new cars, they are still virtually identical. The actual differences are confined to chassis dimensions. Such a restriction might suggest monotony, but as almost anything is available on special order, there is little danger of being caught with "just another Rolls-Royce."

 THERE WILL BE no radically new Porsche production model in the immediate future; the existing models will, however, receive a number of refinements and a new engine will be added to the range.

Most of the modifications are aimed at improving safety and comfort in driving: the headlights have been raised, and so have the new, stronger bumpers, which no longer project beyond the body sides so that the danger of "hooking" is now minimized.

Fog lights can be installed beneath the bumpers, where they are correctly positioned and well protected. The rear window can be defrosted from the heating system; brake cooling has been improved (continued on page 89)



The luxurious and costly Rolls-Royce Phantom V.



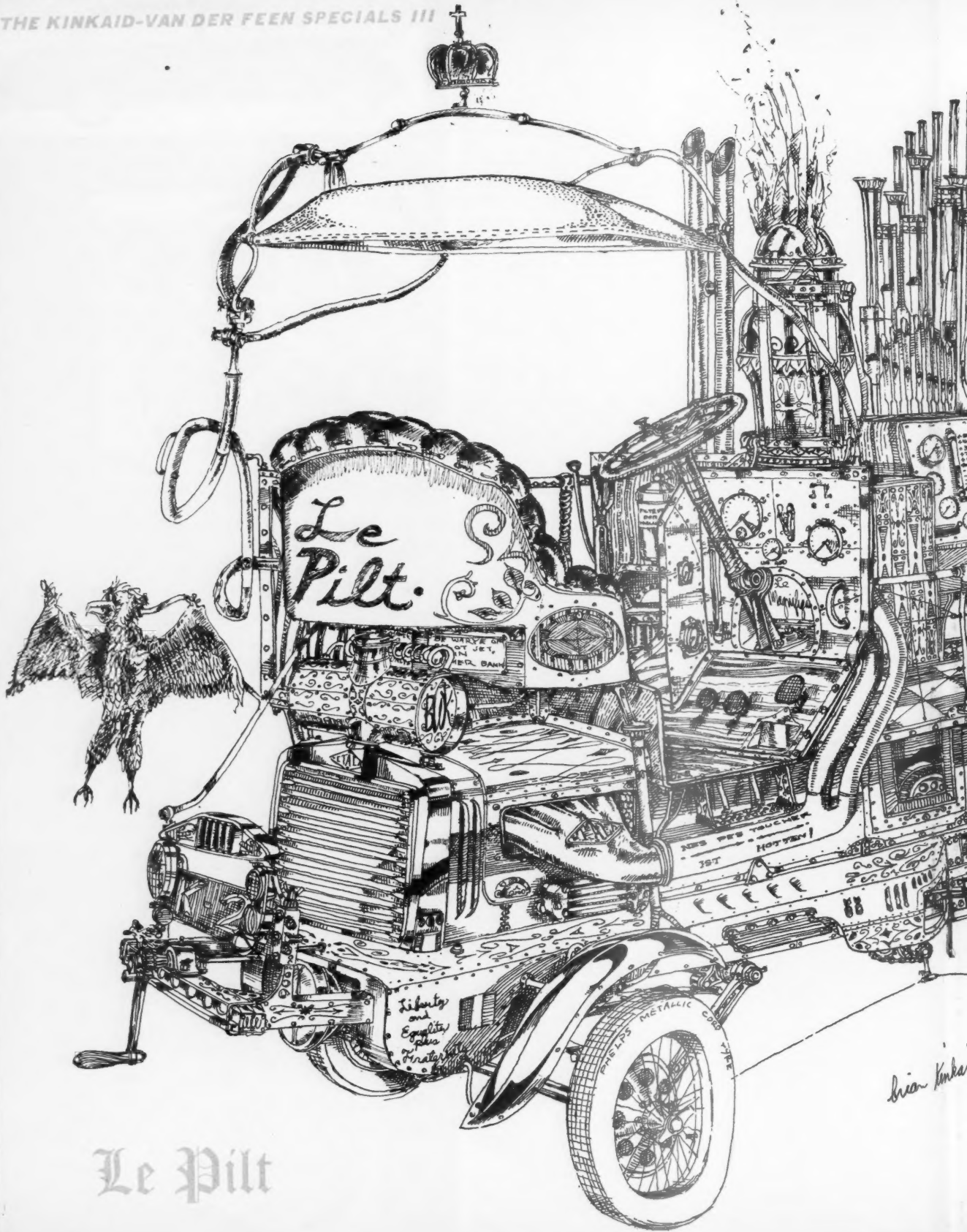
Porsche's dished wheel carries light switch.



Defiant Porsche lurks behind strengthened bumper

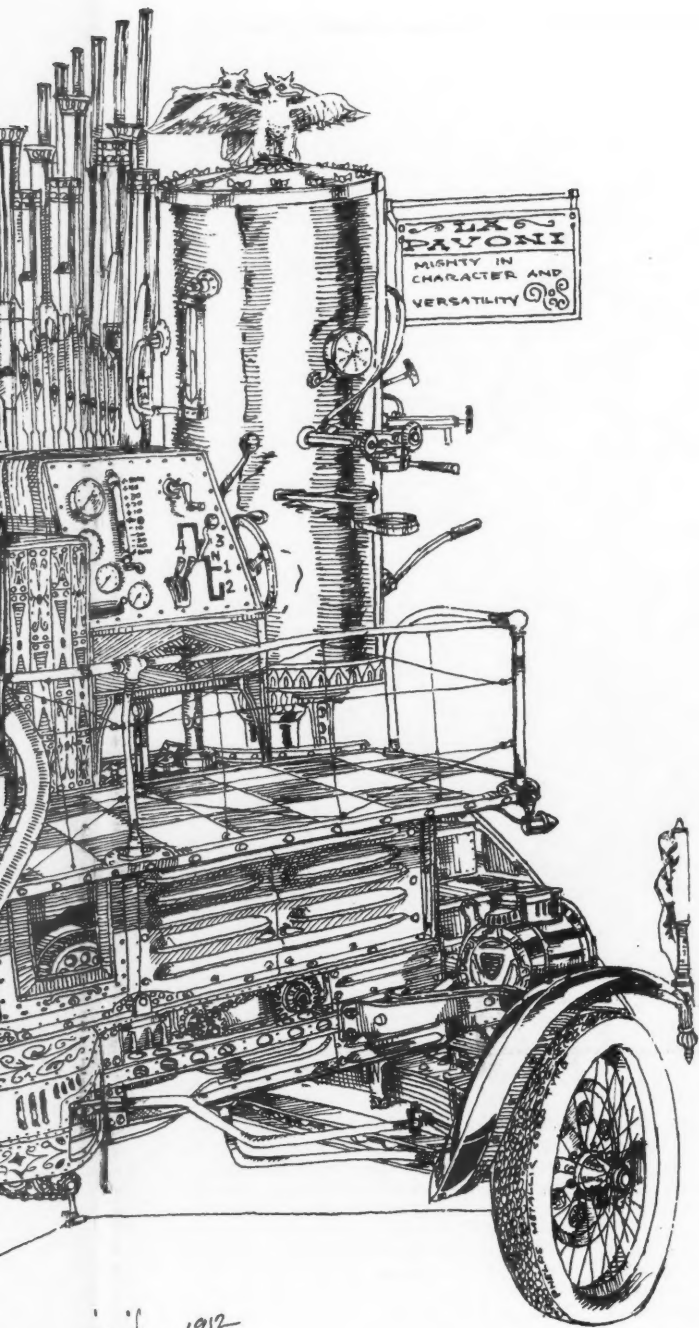
Seats fold down individually for luggage space.





Le Pilt

Brian Kinkaid



THE REGAL LE PILT (correctly Le Pilt., an obvious abbreviation) is a glory of motoring's early days. Surprisingly, this multi-function vehicle, with its wealth of new ideas, was the company's only venture in automotive design (if we may use such a term). Shortly before its scheduled launching, the firm erecting Le Pilt, incorporated in Labrador by a bilingual Sudanese with the main workshop in Silesia, founded and sank. The contemporary collapse of the Central European tin cartel is thought to be only coincidental.

As an example of the coachbuilder's art during the Edwardian era, Le Pilt is stunning. The envelope body, of which only the two-thirds completed is visible here, is the work of Le Pilt company, whose plaque may be detected upon examination. This group of designers was not heard of again until 1955 when, reorganized in new quarters, they appeared in Midland, Mich.

Central to the body design, of course, is the roll bar over the steering (as opposed to the operating) compartment. With its ingenious foot- and hand-holds, yet satisfying the aesthetic considerations of the day, the roll bar is a remarkable structure. The so-called sun shield is in reality an all-weather leather canopy of stiffened elephant hides and is an obvious forerunner of today's hardtop unconvertible convertible.

Surmounting all, of course, is the crown indicative of Le Pilt company's announced plan to produce, at a profit, only economy cars for the crowned heads of Europe. Unfortunately, during the years Le Pilt was under construction, a number of kings were overthrown by democrats and it was found that those remaining had already signed up with other automobile companies.

It is not generally known that "La Pavoni," a modest Italian cafe espresso machine manufacturer, was a silent partner in the enterprise and supplied the boiler, the top of which was also to serve as a hood ornament (two single-headed eagles rampant on a field of butterfly nuts).

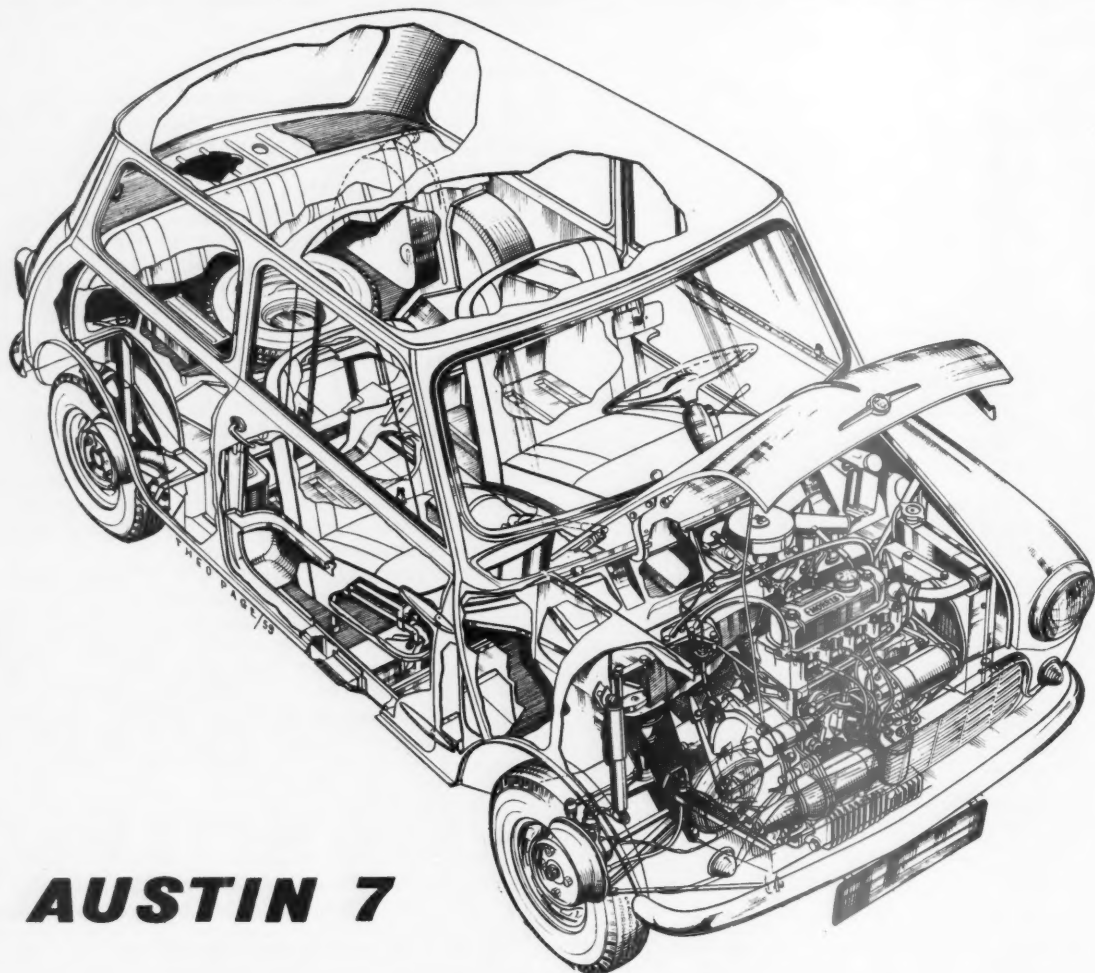
While the coachwork details are undoubtedly fascinating, the modern-day automotive student finds the propulsion mechanism and running gear at least equally worthy of his attention. Basically a rear-engined, front-wheel-drive, 4-cyl steam turbine with 12 auxiliary Bunsen burners and a modified Bessemer converter, Le Pilt was a straightforward example of the thermal engineer's art. Efficient operation of the vehicle was to be assured by a properly trained three-man crew, provided one of them was a musician.

To appreciate the subtleties of Le Pilt's design, it might be well to run through the steps considered absolutely essential before engaging first gear and the resultant risk of an explosion.

After the locomotive had been disconnected from the "locomotive tap" (the small fitting located in front of the steering wheel), and with a full head of steam now assured in Le Pilt's "Quinze Psi" boiler, the "up man" of the crew would go into action. Astride his gaily checkered catwalk, he first checked the steam pressure readings on the locomotive's gauges, *not* on Le Pilt's, as these were notoriously inaccurate from their coffee house use.

Withdrawing the concealed keyboard from under the in-laid backgammon box, this crew member, the musician of the group, played "Der Meist" from Siegfried's "Wagner." This brought the steam calliope into action, of course, a step essential to the proper indoctrination of the steam with the engineer's plans for its further use. The calliope was designed so that only "Der Meist" would do: no other selection would heat the pipes properly.

The last crashing chord of "Der Meist" released a valve which (if it did not shatter the calliope) resulted in directing a huge quantity of steam through a tube which was also useful as a handrail along the left-hand side of the driving compartment. This tube, with a bypass to the roll bar (making it the only known heated roll (continued on page 96)



AUSTIN 7

BY HANSJOERG BENDEL

B RITISH MOTOR CAR manufacturers have often been criticized for their conservative approach, which extends even to small-car building. A typical example of the scaled-down-big-car approach was the Austin A-35, which had been expected to become as popular as the Austin 7, famous in the Twenties and early Thirties. As it turned out, it came nowhere near fulfilling these great expectations, although it was in fact a much nicer car to drive than its somewhat antiquated exterior suggested.

Compact Spaciousness

The new BMC small car follows a radically different line of thought and is a most striking example of fresh thinking. It is obvious that the design team headed

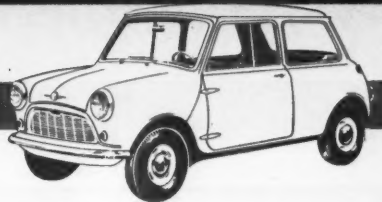
by Alec Issigonis had one main target in mind: the new car had to be a roomy, honest 4-seater with adequate space for luggage, combined with the most compact outer dimensions possible. All other considerations, no matter how important in themselves, were left to later detail development for solution; these included adequate performance, good road-holding, riding comfort and the possibility of economical mass production. Approval of the strictly functional appearance of the car is a matter of taste. With the possible exception of this debatable point, no one will dispute the fact that the target has been reached, and in a very ingenious way.

Front, Rear or Orthodox?

A remarkable number of designers have believed that, at least on smaller

cars, problems of roominess, low build, flat floor and lightness can best be tackled by grouping the engine and the transmission together at one end of the chassis. Issigonis started to investigate for himself in 1951, when he installed a front-wheel drive unit and transverse-mounted engine in an existing Morris model. The resulting road behavior was very promising; it is likely that the greater ease of providing a large, accessible luggage compartment contributed to the final preference given to front-wheel drive. Various engines were tried. After testing air-cooled units, considerations of silence and standardization of manufacture led to a short-stroke variant of the existing Morris Minor engine, and in 1956, the direct forerunner of the new car was firmly established.

The accompanying drawings show that



the body is of integral construction, without a separate chassis. The body shell is welded up from a number of relatively simple body pressings; it combines good rigidity with freedom from rattle. Attached to the body by eight bolts are two units which BMC calls a sub-chassis: the front unit contains engine, transmission and suspension, the rear one embraces the complete rear wheel suspension.

Engined Transaxle

The front sub-chassis incorporates a most remarkable departure from established practice. It contains a water-cooled, 4-cyl, in-line engine, mounted transversely across the car, and a built-in unit with gearbox and final drive. This complete power train is mounted on a transverse sub-frame carrying the actual suspension wishbones and the springing units.

For the engine itself, the well tried A-type BMC engine (as used on the present Morris Minor and Austin A-35) is used. The bore of 2.48 in. was retained, but the stroke was shortened from 2.99 in. to 2.69 in. This decrease is equivalent to .3 in., and the resultant reduction in engine height is so slight that this obviously was not the object. However, the new capacity of 848 cc is definitely advantageous in many countries where road taxes are based on engine size, and 37 bhp—the same power as on the existing, slightly larger engine—appears adequate for a dry weight of only 1260 lb. The radiator is installed to the left of the engine, the fan drawing cool air from the grille and engine compartment and pushing it sideways through the radiator and into the left front wheel well. Under severe operating conditions, this additional heating of one front tire may perhaps be open to criticism.

The 4-speed gearbox lies directly underneath the engine, its driveshaft meshing with a spur gear train driven from the crankshaft above. The differential is located immediately aft of the gearbox and is driven by a pair of helical spur gears. Crankshaft, gearbox shafts and differential axis are parallel to each other, eliminating the need for the usual bevel drive. A large cast housing contains the entire transmission and also plays the role of engine sump. This arrangement has the advantage that there is only one oil sump for the entire power train, but raises the problem of gearbox and differential being lubricated by engine-contaminated oil.

The gearbox has 4 speeds with cone-type synchromesh on the upper 3. There is a central gear lever actuating the selector forks via an intermediate shaft and a ball joint mechanism.

From the differential, the drive passes to two open driveshafts. Due to the compactness of the transmission, there is very little natural flexibility. In order to create the necessary resilience, BMC has adopted inner universal joints with conical rubber bushes in place of the usual

needle-bearing cups. Connection between the universal joint hub and driveshaft is by splines provided with a grease nipple. This furnishes the necessary freedom for a slight lateral movement.

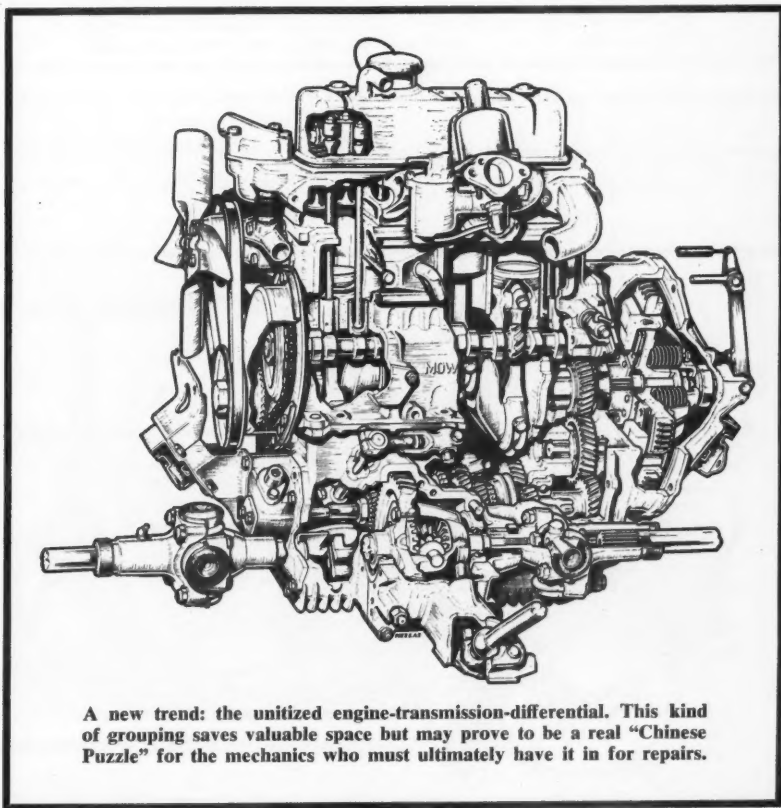
Rubber Springing All Round

Front wheel positioning is by wide-based lower wishbones and single upper transverse links with ball-type articulation. Telescopic dampers are connected to the upper links in the usual fashion. Similar to this method of coupling an existing engine to a most unusual transmission, the usual wheel location is combined with an entirely novel springing medium. Near to the inner articulation of the upper link, a vertical pushrod of conical shape is attached. This pushrod acts on a rubber ring bonded between two conical metal retainers. Springing stresses are taken up by these Dunlop-made spring units as a combination of compression and shear stresses. This makes it possible to obtain a commendably compact springing unit which is absolutely silent, requires no maintenance and provides the progressive spring rate so necessary for this light car. Starting with a dry weight of 1260 lb, 4 adults, one child and some luggage may easily increase the loaded weight to 1900 lb, an increase of 60%. Constant-rate metal

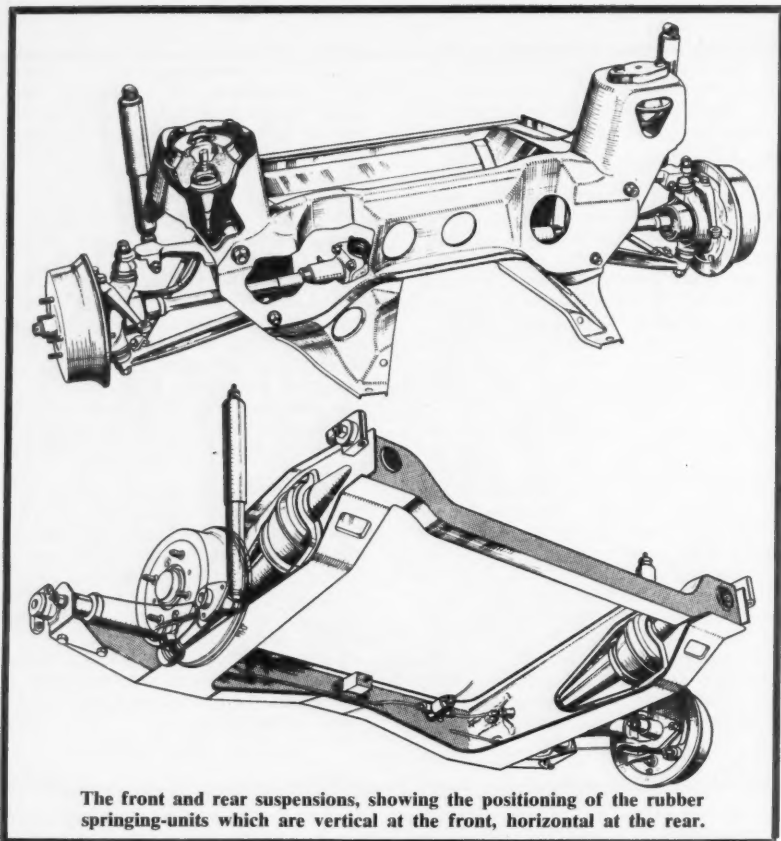
springs would either have led to a very harsh ride in the unloaded car or would have necessitated an impossibly long wheel movement. It is interesting to note that the attachment points of the spring units are close to the inner pivot of the location link. This results in fairly small actual rubber deflection and appears to call for very close tolerances in the manufacture and adjustment of the rubber units.

It may also be recalled that the Italian firm, Isotta Fraschini, developed a similar-looking springing system for the large rear-engined Monte Rosa prototype cars in 1948. The new BMC cars will be the first mass production representatives of this promising technique. Steering is by means of a rack and pinion gear passing across the car just behind the engine block.

The rear wheels are positioned by fairly long, welded-up trailing links installed almost horizontally. These links are integral with short rockers which act on conical pushrods of spring units similar to those used in front. The location looks very similar to that used on the latest Citroen designs and allows the use of a sub-chassis of very low overall height. Again, telescopic dampers are used to supplement the natural damping inherent in the rubber units. *(continued)*



A new trend: the unitized engine-transmission-differential. This kind of grouping saves valuable space but may prove to be a real "Chinese Puzzle" for the mechanics who must ultimately have it in for repairs.



The front and rear suspensions, showing the positioning of the rubber spring-units which are vertical at the front, horizontal at the rear.

Weight distribution

On a front-wheel driven car, drive-wheel adhesion is of great importance, particularly when climbing steep hills.

The BMC solution lends itself naturally to excellent performance, since the entire power train is mounted at the extreme front end of the car. Unloaded, 60% of the total weight is carried by

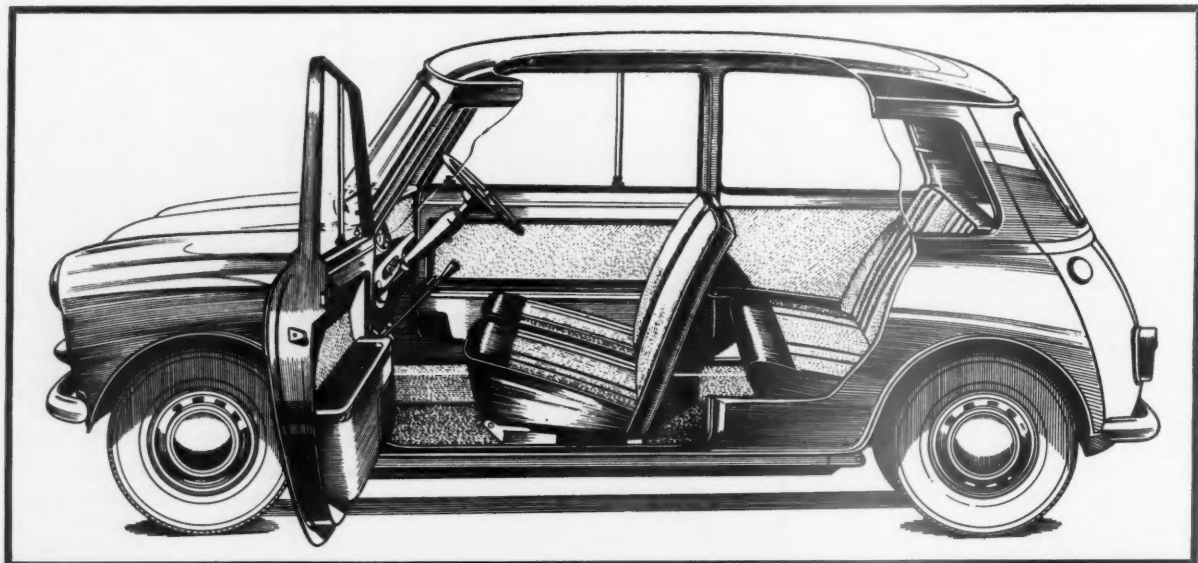
the front wheels. A less desirable result of this high weight percentage on the front wheels is the fact that the rear wheels will not carry sufficient weight under heavy braking, so that in an emergency, the rear tires may slide. This danger is countered by a cut-off valve that closes the supply of brake fluid to the rear brakes as soon as a predetermined brake-line pressure is reached. Pressure in the rear brakes then remains constant until the master cylinder pressure has decreased again, making it virtually impossible to lock the rear wheels. There are 7 in. drums with single leading shoes all around, apparently adequate for the low weight of the car. The friction area is 67.5 sq in.—quite generous. Tubeless tires of 5.20-10 were selected, which allowed very small wheel wells and a comparatively compact turning circle.

Driving impressions

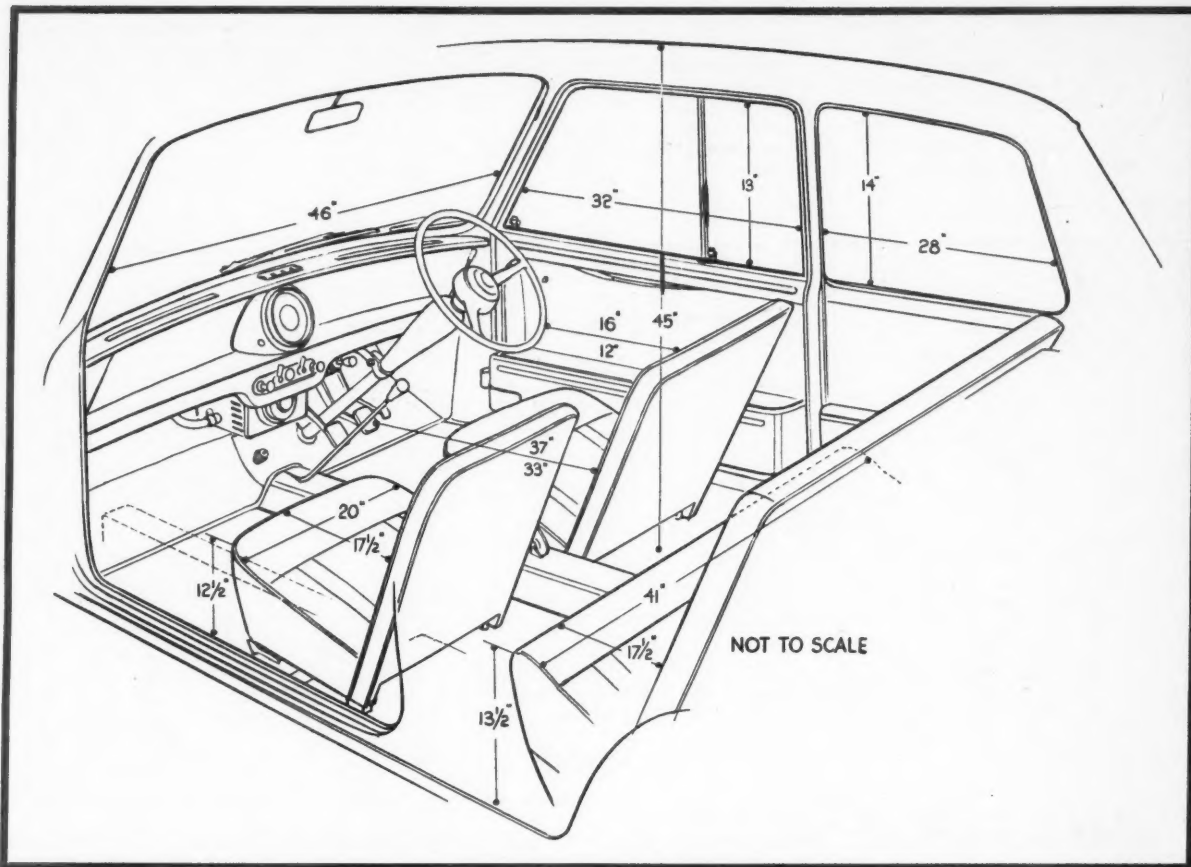
In order to gain some first hand knowledge of the car, we welcomed the opportunity to drive one for about 2 hours over varied roads. Our notes:

Roominess: It is undoubtedly a real 4-seater. Width and interior height are ample and the leg room is quite sufficient for 4, provided that extra-long-legged passengers are not too selfish with regard to seat adjustment. Padding of the seats is a bit thin and the fixed angle between seat cushion and back rest appears to be on the narrow side. During vigorous cornering—which the car invites—additional lateral support would be welcome. Visibility is excellent from all seats; ventilation is adequate, but we can not quite say that it is draft-free.

The single instrument provided contains speedometer, fuel gauge and warning lights for oil pressure and dynamo. A full-width front shelf and very large boxes in both doors and on both sides of

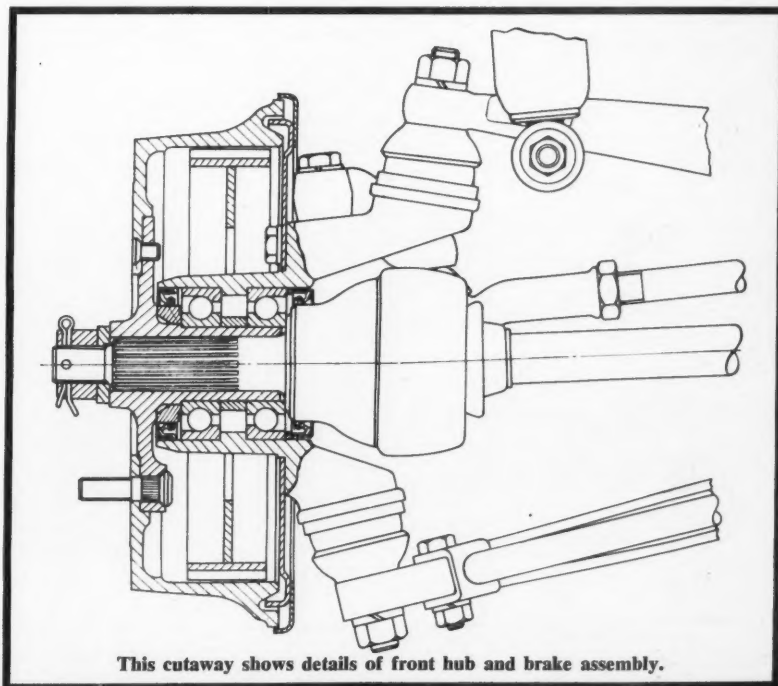


TECHNICAL ANALYSIS



the rear compartment provide carrying capacity not equaled on many larger cars. In front, silence is disturbed only by a tolerable gearbox whine, whereas some drumming was noticeable in the rear. The felt carpets and interior decoration are plain; many people might prefer simple rubber mats.

Driving: The pedals are a bit close together and the throttle foot is too near the gear lever. Apart from this, the controls are pleasant. The clutch engages smoothly and without any trace of fierceness—a first class solution. The gear change, at least on the fairly new test car, was sticky and not too positive; the synchromesh can be beaten. The well engineered transmission, however, suggests that these were shortcomings peculiar to the car we drove. The steering commands our highest praise; it is wonderfully light, quick, with only 2.3 turns from lock to lock, embodies great precision and yet never feeds back shock or vibration from the road. The road holding is equally superb: in fast bends, as well as in hairpins, the car goes around safely and easily, with very moderate roll. Even with one drive-wheel on loose ground, there is no loss of stability of steering-wheel reaction. When approaching the limit, there is increasing but entirely controllable understeer. (continued)



This cutaway shows details of front hub and brake assembly.

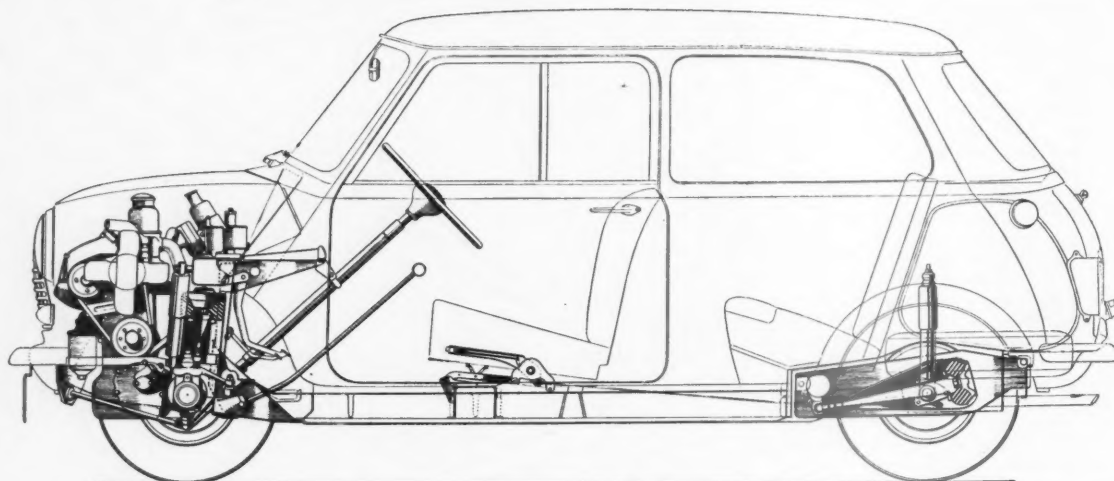
TECHNICAL ANALYSIS

The brakes are good, with the anti-lock effect of the cut-off valve keeping the car straight even under severe braking. Springing and damping are excellent. So far, only cars in much higher price brackets provide similar combinations of firm yet comfortable ride, faultless damping and practically complete isolation from

discomforts caused by road irregularities.

Performance: The factory claims 75 mph top speed, a maximum tractive effort in top gear of 176 lb/ton and 0-50 mph acceleration in 18 sec. We did not time the car, but acceleration and hill-climbing ability are obviously of a very high order.

Forecast: VW proves that any package can be sold if contents and price are right. BMC's major problem appears to be to convince people that the not-overly-attractive exterior hides top class engineering rather than the minimum-requirement solutions to be found in some other present-day small cars. ■



AUSTIN 7

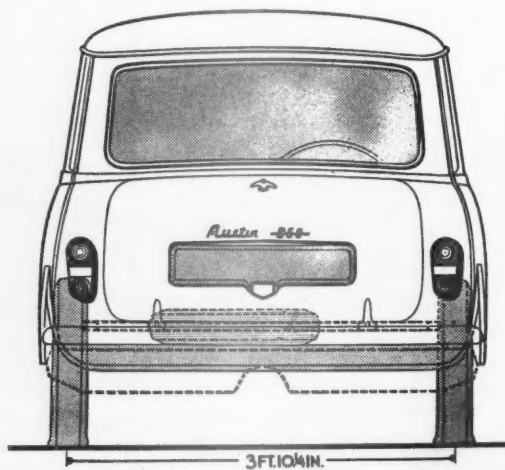
TECHNICAL DATA—COMPARISONS

Engine capacity, cc
Bhp/rpm
No. of speeds
Mph/1000 rev in top
Weight dry, lb
Lb/hp
0-50 mph, sec
Top speed, mph
Wheelbase, in.
Overall length, in.
Overall width, in.
Turning circle, ft

	Morris-Austin	VW	Dauphine	Fiat 600
Engine capacity, cc	848	1192	845	633
Bhp/rpm	37/5500	36/3700	35/4500	28.5/5000
No. of speeds	4	4	3	4
Mph/1000 rev in top	14.85	20.2	14.4	12.8
Weight dry, lb	1260	1560	1400	1260
Lb/hp	34.0	43.3	40.0	44.2
0-50 mph, sec	18	18	21	37
Top speed, mph	75	68.5	72	62.5
Wheelbase, in.	80	94.5	89.3	78.7
Overall length, in.	120	160	155	129
Overall width, in.	55	60.5	59.8	54.4
Turning circle, ft	29.5	33	28	28



4 FT. 5 IN.



THE SPORT AND INDUSTRY IN CANADA

BY RICH CLEE

IN ADDITION to the information on racing circuits contained in the October issue and in this issue on pages 60 to 65, the following may help those who would like to attend races in Canada.

All tracks in Canada, with the exception of those in British Columbia, are run under Royal Automobile Club rules, plus the local amendments of the Canadian Automobile Sports Club. Organization is handled by the individual club sponsoring the event or, at Edenvale, by Ab Steinberg.

Overnight camping is usually tolerated. Accommodation at all tracks can be tricky to find for those who come late, but a good search will usually turn up something reasonably close. Fair warning: restaurants around tracks are far away, few and poor; accommodations will be fully adequate but far from the high quality standards of the typical American luxury motel. Rates, however, do tend to be quite reasonable and there are inside plumbing, running water and heat, even if TV and air conditioning are rare.

Visitors to Canada will find the country thinly populated and less wealthy than the U.S. This shows up in a relative scarcity of motels, restaurants and service stations, and those that do exist are obviously operated on a limited capital outlay. You'll never get stuck, and the prices are awfully kind to the budget, but those who like their luxuries had best make a serious study of Duncan Hines before plotting their route.

The Royal Automobile Club of Britain has now given up control of auto sport in certain of the Commonwealth nations. Encouraged by this, the Canadian Automobile Sports Club has been in correspondence with both the RAC and the FIA regarding full affiliation as a national auto club. The RAC has indicated a willingness to sponsor a Canadian application to the FIA, but correspondence to date suggests that this may not be necessary.

Before any commitments are made, however, a careful analysis will have to be made of the financial aspects. The CASC remains not too strong financially.

Not entirely in the CASC's favor is the fact that it does not cover British Columbia. For reasons of geography, the British Columbia club has found it expedient to join forces with the U.S. Pacific Northwest conference.

This group follows certain policies in race programming that are at variance with the FIA classes and practices, and there is always the possibility that conflicts will arise. The British Columbia group does maintain a cordial relationship with the CASC and fellow members of the sport in Canada, and it appears probable that, if the difference in procedure can be sorted out, Canada soon

will have a fully national and internationally recognized group.

Ed Otto, the Nascar promoter, was in town (Toronto) for a day recently. In the course of a discussion at the Press Club, he was needled a bit by Gord Walker, a sports writer for the *Toronto Globe & Mail*, and came up with the statement that his "production U.S. cars, on a sports-car track at Harewood, would beat any and all sports cars in any race." He specifically included such machines as the Porsche, Lotus, Jaguar and Mercedes-Benz.

He also added that his boys would be glad to stage a match race of any length on any sports-car track at any time, with the gate proceeds to go to charity.

Naturally, the local sports-car fraternity struck at the bait like a maskinonge at a swimmer's toe. Ab Steinberg, the promoter of Edenvale, offered the use of his track free, the only qualification being that the proceeds of the event should go to a crippled children's swimming pool fund sponsored by the sports editor of the *Globe*.

The Sports Car Club invited Nascar entries for their August 15 event, offering a part of the gate for the same charity. A re-match, if desired, was to be held at the September 12 races of the British Empire Motor Club on the same basis.

By the time the statements were out, Ed Otto had left town. Walker, however, passed on the challenge. Otto replied that his offer still stood, but that the first open date he had was September 20.

The attitude of the local sports-car drivers is, "Let us at 'em!" The only problem, it appears, will be limiting the number of entries to a reasonable figure.

The clubs are under no illusion that the stock cars will be easy to beat. But with the local Lotus XV, Porsche RS and possibly a Sadler to head the field, and various other Lotuses, Porsches, Elvas and Corvettes to back up the challenge, there is little doubt (at least with sports-car clubmen) of who will win.

The latest word is that the race is scheduled for September 19 at Harewood. By the time this issue reaches the newsstands, the race will be history.

All concerned know by now that the date of the British Empire Motor Club Fall Races at Harewood has been changed from September 26 to September 12, to avoid conflict with the Watkins Glen event. Once again this points up the lack of liaison between clubs in the U.S. and adjoining Canadian regions.

Local reports are naturally prejudiced and tend to lay the blame at the doorstep of the SCCA. Complaints are chronic, particularly at the national CASC level, that correspondence goes unanswered and that questions draw a stalling or evasive reply. Inter-club liaison is equally bad. John Greenland, entry clerk for the North Toronto Motorsport Club, told me that his club had written to every Northeastern region of the SCCA requesting a list of member clubs so that information regarding their Sundown Grand Prix could be sent. As of three days before the race, not one region had replied.

U.S. citizens, with three Canadian tracks almost on their doorsteps, enjoy

racing in Canada. Usually up to a third of the field at any Canadian event will be made up of entries from the U.S. The several club magazines sent out by border state U.S. clubs devote a good deal of attention to Canadian activities and are flattering in their comments.

Nevertheless, disturbances continue, such as the conflict of dates for events and the question of whose competition licenses shall be honored. If the CASC takes on full ACN status with the FIA, the difficulties will be intensified. Canadians look forward to some overtures from the SCCA regarding closer liaison, as their own suggestions have been for so long rebuffed or ignored.

We wonder what effect all of this will have on the proposed 7000-mi rally. It is definitely off for this year, but latest reports are that a sponsor is now engaged in working up an advertising program to promote the venture to be run in August of 1960. The advertising agency involved will make no statement and will not even confirm or deny that a contract has been signed. But such information as has leaked out places the start in Toronto early in August to tie in with the Canadian National Exhibition.

It is felt that the exhibition park with its ample parking space and large-capacity grandstand will be adequate to handle the crowds expected for the start, while the finish would ideally be scheduled for the opening day of the exhibition. Running the rally during the exhibition period itself, it appears, would cause too much competition for publicity, with the "sideshow" rally losing attention to the big annual fair.

One of the reasons for the shortage of big, high-powered racing machinery in Canada is the fact that used cars can't be brought into this country. There has been mild agitation from time to time to have the blanket ban revised to permit the entry of certain special machines.

We now hear that the Vintage Car Club of Canada has engaged a lawyer to prepare and present a brief to the federal government, asking permission to import machines over 20 years old. Some sources report that preliminary feelers have met with a favorable reception in government circles. Since the applicable section of the Customs Act can be revised by an Order-In-Council (that is, by executive fiat of the Prime Minister and his Cabinet without the necessity of a full debate in Parliament), revision is easier and less embarrassing for the government to arrange, and could be accomplished soon.

The vintage-car collectors are serious and have built up quite a war chest to push their bill. They expect the regulations they are seeking to become law soon.

As it stands, the action will mean little or nothing to sports-car drivers. But with a precedent, a method of approach and proper channels established it should not be too difficult for the sports-car clubs in their turn to gain a concession on the importation of all-out racing equipment. Such a move would then allow drivers with limited budgets to acquire used competition machinery, principally from the U.S. (continued on page 88)

LITTLE LE MANS

Neither heat, nor humidity nor Volvo could stay these Roosevelt Abarths

BY EV GARDNER

PHOTOS BY WARREN BALLARD

VOLVO'S DOMINATION of Lime Rock's Little Le Mans was ended abruptly when two tiny Fiat-Abarth-Zagatos finished 1-2 in the annual endurance race for imported sedans. (Ed. note: It seems the definition of what constitutes a sedan is a rather loose one.)

The winning Fiat-Abarth, one of a three-car team entered by the Roosevelt Auto Company of Washington, D.C., was driven by Skip Callanan and Roger Penske. Callanan has been driving Fiats all season. Penske is one of the top Porsche RSK chauffeurs in SCCA ranks.

The race was run in suffocating, humid 96° heat and several drivers came into the pits suffering from heat exhaustion. A half-dozen flips and sundry assorted bashings marred the day, but there were no injuries.

Callanan and Penske covered 501 miles in the eight-hour grind, shortened 2 hours from previous years by a newly passed town ordinance. Average speed was 62.6, up more than 2 mph from last year.

The two previous runnings of LLM resulted in Volvo runaways. The rugged Swedish cars swept the first five places in the 1957 inaugural and finished 1-2-3 last year. This time, the top Volvo was 3rd, 17 laps off the winner. Only one other Volvo finished of the six entered, and it was 19th.

Still, it took the luckiest kind of a break to give the fleet \$4000 Abarths the victory, even though they were by far the most costly cars in the field.

The 1957 Volvo, driven by owner Art Riley and Bill Rutan, which won both previous Little Le Mans races, came within a little more than an hour of making it three straight. As Riley sped through the chicane at the end of the home stretch, one of the release fingers in the clutch snapped and the car was locked in 3rd gear. The noise was so sharp Riley thought the car was through and pulled over on the verge.

He found he could jam the shifts despite the locked clutch and got going again as spectators gave him a push. For the next 16 laps the car was as fast as ever, turning in a 1-min 21.8-sec lap, one of the fastest of the day. Race officials blackflagged him and disqualified the car when they learned he had received outside assistance.

From that point on, all the two Fiats had to do was finish, as they were far ahead of the 3rd-place car, the Volvo driven by John Christy and radio and TV

58 ROAD & TRACK

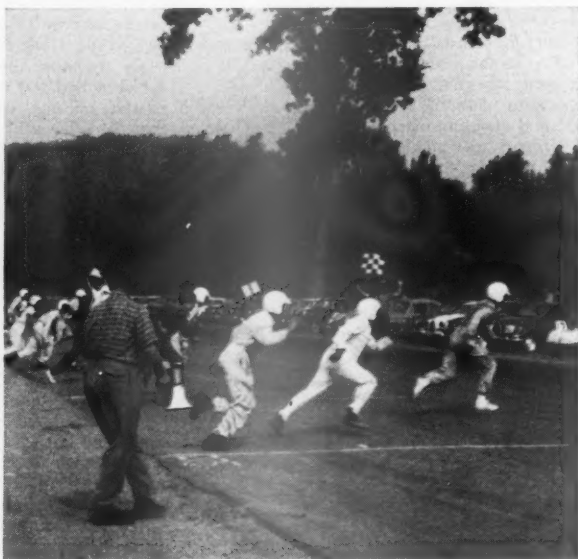
newscaster Walter Cronkite—the only Volvo to place.

After the 3 top cars, the next 5 places went to five Saabs. Fourth was a GT with John Iglehart and Alan Dillenbergh, and it was followed by one of the two 4-speed GT's entered, driven by Dick Thompson (of Corvette fame) and Joe Dodge. Sixth was the Charles Cunningham/Chandler Lawrence 93-B, and then another GT with Dean McCarthy and George Valentine. Another 93-B was 8th, teamed by George Constantine and Bob Grossman.

Pete Barber and George Sanderson toolled a compact NSU Prinz to 9th over all and first in class G (up to 650 cc).

The Volvo backers got some consolation when Vern Bennett registered two consecutive 1-min 20-sec laps to win a special trophy for the fastest lap.

Bennett got the No. 3 Volvo off first as 34 drivers



The starting sprint, with Paul Richards leading, Abarth-bound, and remainder of Fiat and Volvo teams close behind.

sprinted across the track in the colorful Le Mans-type start. Baptista had a first lap he'll always remember. At the start he jumped in his car, started up, shoved it in gear and was off—in reverse. Another shift and he started—rather sluggishly, in 3rd. Frank got around to the back slopes and tried to close the half-latched driver's door. He pushed the door handle the wrong way and was pulled out, with the seat of his coveralls extending well out over the track. He finally pulled himself back in, buckled his seat belt and proceeded.

After a few laps the battle for the lead boiled down to a five-car scramble with the Riley and Bennett Volvos in front at the end of the first hour, followed by the Callanan and Cuomo Fiats and the Canadian Volvo handled by Gary Ross and Ross Desterio.

During the 2nd hour Ross wobbled into the pits in the

flagman has murder in his heart when he sees some clown mow down 75 yards of pylons that he might have missed with a little effort.

There are other hazards. At the last race I flagged, I happened to hear, "If you spin out or break down out on the course, look before you get out of your car. We killed 18 rattlesnakes last week when we were mowing." This warning was directed exclusively to the drivers. Apparently it slipped everybody's mind that the flagman would be working steadily out in those boondocks. It didn't slip the flagmen's minds, you can bet the family bomb on that.

Another of the never-ending jobs of the flagman is the removal of hazards that develop during the course of a race. At the Miami Nationals last year, a friend and I were working an interesting acute right that had an 8-ft-high beaverboard pylon on the inside apex to discourage short-cutting. On one of the first laps of the big-bore event, Mr. Kimberley casually toured right through this structure at a high rate of knots in his 2-liter Maser. It was an awesome sight. Beaverboard went straight up, in addition to assorted other directions, with enthusiasm. I was positive that the car, at least, had been retired from competition. Not so. Kimberley and car emerged from the melee and roared into the distance, leaving the subsequent fallout to the flagmen.

My friend hung out the flag and I scampered to the scene and laid hold of a large piece of wreckage, dug in my heels and commenced pulling. Right then another contingent of large-bore machinery came through. Now I have no doubt that these gentlemen had backed off in response to the yellow flag. Nevertheless, from a distance of 2 ft a D-Jag going past with gusto is rather diverting. It is also noisy. Fortunately, on my backward leap I kept a deathlike grip on the largest piece of beaverboard and brought it with me. I left the competitors to deal with the lesser fragments as they saw fit. Strangely, the Maser showed no signs of the encounter.

Crowd control and course maintenance are just two of a flagman's jobs. During the actual race he is expected to keep an eye on the condition of the cars, too. As each car goes by, the flagman eyeballs it closely to see if it's all right. He looks for dragging gear, loose hoods and decks, spilling fuel, etc. If he sees something out of order, he passes the word to the comm man, who in turn passes it in to control. Further action is at the option of the starter. Also, the flagman must keep an eye on re-entry

techniques. Failure to re-enter the course at the departure point irritates the flagman: in addition to being against the rules, it increases the confusion on the corner.

There is a lot the flagman can do to ease the plight of the misplaced motorist. Frequently a car will go off the course, pinwheeling busily around the gear selector lever in a maneuver that tends to confuse the operator. The flagman can help here by pointing out the spot where the car left the course, and the driver can get sorted out with the minimum loss of time. The driver who motors off the course more or less under control is, in some ways, even worse off. He has no trail of rubber to back track, and he may have come to a halt quite a piece from where he deviated. The flagman can perform a signal service by pointing out where the driver goofed and aid him in re-entering the course at the point of departure.

The flagman has to decide whether or not a given car can make it in a given situation, and let the wandering one re-enter only when there is room. Naturally, he would be ill advised to wave out a Sprite if a Porsche RS is approaching at maximum urge. On the other hand, a hot car can get clear with amazingly little room.

All these other duties are secondary to the flagman's prime function: warning drivers in the event of emergency. To the driver and spectator it may seem to be simply a matter of waiting until something goes wrong, but it is a definite art.

First of all, a good flagman never takes his eyes off his corner if there is a car approaching, passing through, or leaving it. Somebody may slip at any time in racing, and if the flagman is goofing off the results will be serious. The flagman must watch every car in his area all the time. In a 25- or 30-lap race this is not exciting, it is work.

Furthermore, the flagman can not simply watch, he must get some idea of the behavior of every car and every driver. He must immediately (continued on page 94)





PHOTOS BY WILLIAM CLAXTON

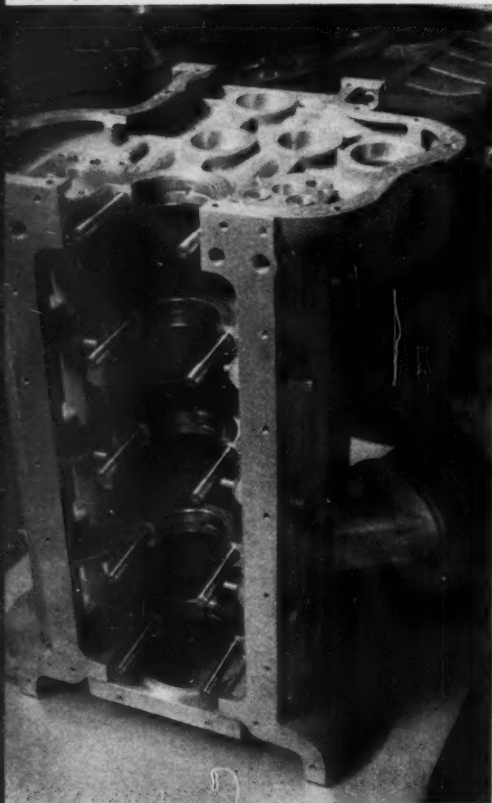




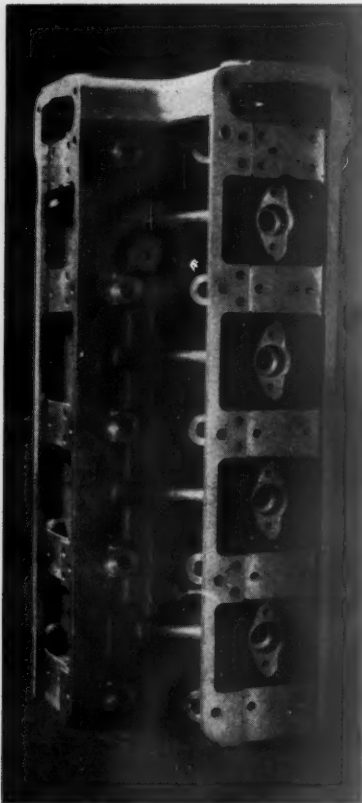
The powers behind the effort: Lance Reventlow, Warren Olson and Chuck Daigh.

THE SCARAB FORMULA ONE

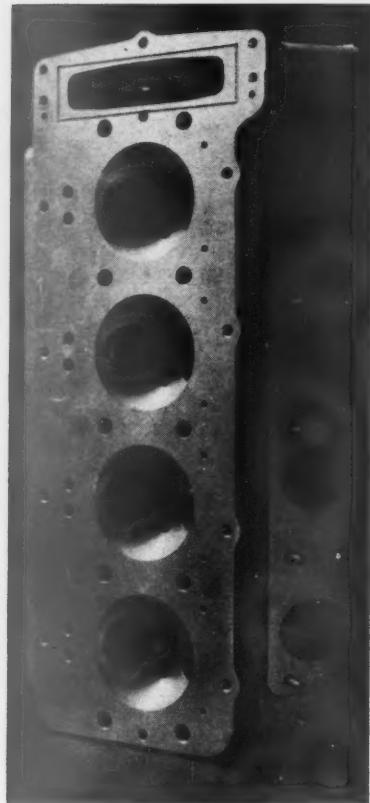
A PICTURE REPORT ON ITS CHANGES, PREPARATION AND TESTING



Most of the machine operations have been completed.



However, hours of hand fitting remain to be done.



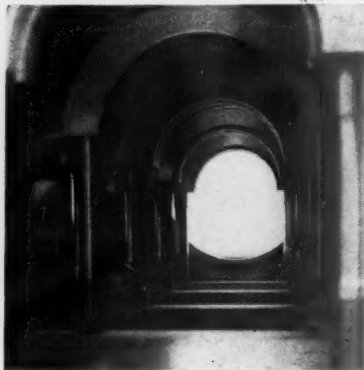
Both combustion chambers and inlet ports have mirror finish.

THE SCARAB FORMULA I

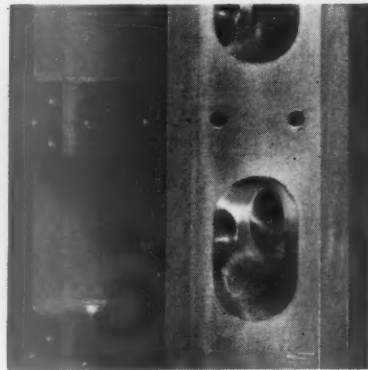
Marsh Whitfield, designer of the radical Formula I Scarab.

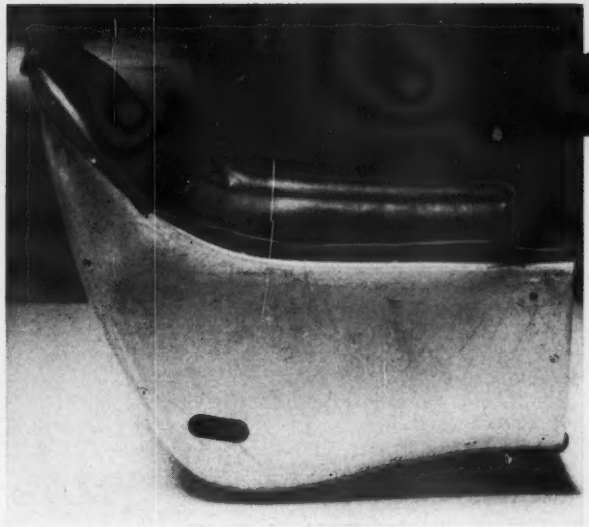
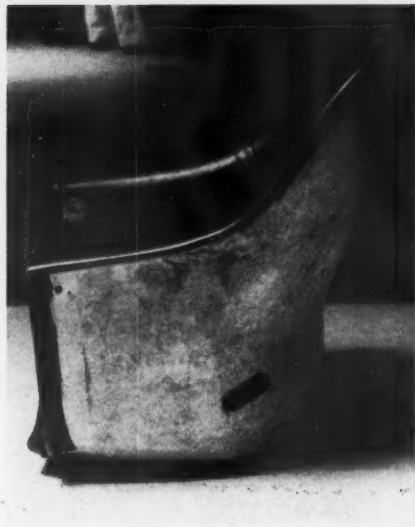


An unusual view of the 2.5-liter engine's lower end.



Exhaust ports are oval and, unlike the intakes, come straight out.



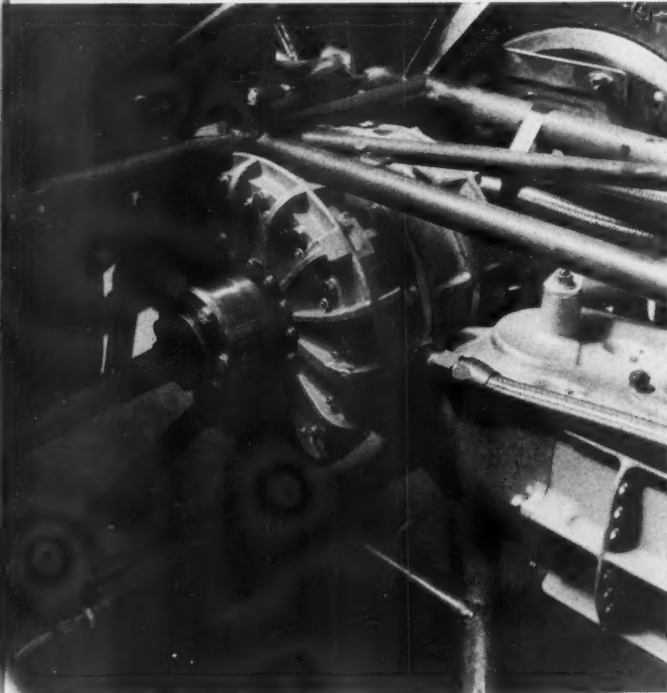


Even the seating is subject to experimentation. The seat at the right holds the driver in a slouched position and supports the legs almost to the knee. The shorter seat was designed by an anthropologist to be a contour-fit on Mr. Reventlow's nether topography.

PHOTOS BY RALPH POOLE

A single water-cooled disc brake is driven by the ring-gear and acts through a ZF sliding-cam type differential to each rear wheel.

The disc brake is constructed like a clutch, with the lining on the disc and a set of pressure-plates gripping it.



Although Ferrari swept to a team victory, it was a sad weekend in Berlin.

STORY AND PHOTOS BY BERNARD CAHIER

EVER SINCE the Automobile Club of Germany first announced that the German Grand Prix was to be held at Avus in Berlin instead of on the incomparable Nurburg Ring, there had been much discussion and uneasiness among team managers and drivers. This track, rightly considered both dangerous and outdated, was selected by the Club for political reasons (pressure from the Mayor of West Berlin) as well as financial. A full capacity crowd was a certainty, with the large population of Berlin starved for entertainment of this kind. As expected, it turned out to be a very profitable racing weekend, but at a high cost to the racing world when one of its controversial but most colorful figures, Jean Behra, was killed at the wheel of a Porsche. Behra's death proved that the fears of the competitors were well grounded. The race itself proved only what we already know: that the Avus track, which calls for very little driving skill, is the fastest in the world, with speeds well above those of Indianapolis. This year's lap record (set by Brooks, who averaged almost 150 mph) is quite a staggering figure, especially when you consider that the track consists of two parallel straights with a hairpin curve at one end and a fast bend leading into the banked curve at the other.

The first Avus track, which consisted of a long conventional oval with just the two straights, was built by the Kaiser in 1912. In 1924 these straights were lengthened to almost 12 mi and were included in the newly constructed Autobahn. Hitler, to provide a really spectacular show place for the powerful Mercedes and Auto Union cars of that time, had high-speed bankings built at each end of the circuit. These were constructed of brick and, unlike the cupped bankings of Monza and Montlhery, were flat like a slanted wall. The result was indeed spectacular: the 1937 race was won by Lang in a Mercedes at 162.2 mph, and the unforgettable Rosemeyer turned the fastest lap of the day at more than 170 mph. But it must be remembered that these cars were big and heavy—specially built for pure speed—and, of course, the track itself was

Hill, Allison and Gurney reflect pre-race tension.



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**AUTOMOBIL-WELTMEISTERSCHAFT
GROSSER PREIS
VON DEUTSCHLAND**

**2. AUGUST
14 UHR**

PA 54 x 14 gl. BERLIN

AVUS

SONNABEND, 1. AUGUST · 15 UHR

GROSSER PREIS VON BERLIN

DEUTSCHE AUTOMOBIL-MEISTERSCHAFT

VERANSTALTER: AUTOMOBILCLUB VON DEUTSCHLAND E.V. - A.V.D.

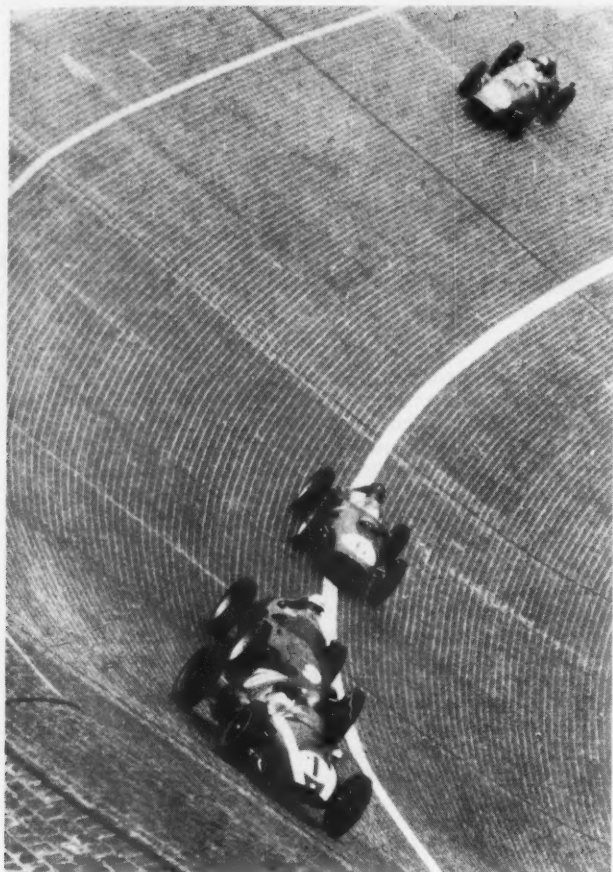
Pre-race publicity for the controversial Avus circuit.

in good condition. In the past 22 years, the track has been reduced to just over 5 mi in length, retaining only one of the banked turns. This turn has never been resurfaced and is now very rough. Several races have been held on this track since the war; one in 1954 was won by Kling's Mercedes at a 132.35-mph average, but still no one liked the place.

This year's racing program included a sports-car race for cars up to 1500 cc on Saturday and two races—a Formula I event and one for GT's—on Sunday. The GP field was quite small, consisting of only 15 entries: Ferrari had three cars to be driven by Brooks, Phil Hill and Gurney. There were also three BRM's with Schell, Bonnier and Herrmann (who was driving the BRP car). Brabham, McLaren and Gregory were listed for the three factory Coopers, and Moss and Trintignant had Walker-Coopers. Lotus had two entries, with Graham Hill and Ireland up. In order to have German cars in the race, two Formula II Porsches were included, to be driven by von Trips and by Behra (his own car). On reserve were a factory Ferrari with Allison at the wheel and Centro-Sud's Cooper-Maserati, to be driven by Burgess.

Moss had a brand new Cooper with the latest head—like Brabham's at Aintree—and, with the exception of Allison's Ferrari, which had a new experimental engine, there were no other changes in the cars. Allison's engine was a full 2.5 liter (instead of 2.417 as on the others) and it had a new head, new valves and camshafts, which gave him at least 8 more bhp as well as increased rpm.

Trials were held for three days so the drivers could get used to this unusual track and so the necessary car modifications could be made. Changes had to be made on



Brabham, Bonnier, Gurney and Hill on the 43° banking.

almost all of the cars, as they were touching bottom on the banking. This was very rough on the drivers, all of whom agreed that it was an unnecessarily dangerous type of track and complained loudly about it.

As the drivers became more accustomed to the track, the practice speeds increased daily. Finally Allison turned in the fastest time of all: 2 min 5.8 sec at a speed of 147.58 mph. Then came six men within 0.4 sec of each other: Gurney and Moss at 2 min 7.2 sec, Brooks and Brabham at 2 min 7.4 sec, Gregory at 2 min 7.5 sec and Phil Hill at 2 min 7.6 sec. Schell's was the fastest of the BRM's with 2 min 10.7 sec; Graham Hill led the Lotuses with 2 min 12.1 sec. The Formula II Porsches were naturally well out-paced, with Behra and von Trips doing 2 min 22.7 sec and 23.4 sec, respectively. The trial times indicated how close the battle was going to be. Although the Coopers' times compared favorably with the Ferraris', the red cars from Maranello were nevertheless the favorites, being more powerful, heavier and with infinitely more suitable chassis. The Ferraris definitely appeared to be more at ease on the bankings. The most frightening to watch were the Porsche sports cars, which seemed to jump from one bump to another while taking the banking at speeds close to 120 mph.

All the trials were held on a dry track, but shortly before the start of the sports-car race on Saturday afternoon, it started to rain. As soon as the race was on, things began to happen very rapidly indeed. On the 2nd lap von Dorey's Porsche came out of the bank in a wild spin for about 300 yds, finally crashing into the cement wall protecting the grandstands. Fortunately, he was unhurt. On the following lap, de Beaufort went over the top of the

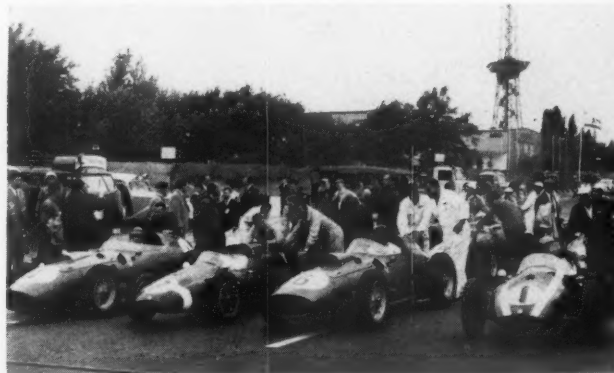
banking in a spectacular way. His car reappeared on the track a few minutes later, with only a crumpled nose. Miraculously, de Beaufort's car hadn't turned over when he went over the top. After riding down the dirt- and tree-lined bank which supports the turn, he found himself in the parking lot and by reflex just drove back onto the circuit, where he completed another lap before he realized what had happened to him and was black-flagged off the course. Meanwhile the battle was on up front between the factory Porsches of von Trips and Bonnier, which were tailed by Behra in a Porsche RSK.

Only one lap after the de Beaufort incident Behra, trying to make up for lost ground, took the banking too fast and too high. His car went out of control and hit a concrete block at full speed, disintegrating the car. The man who had escaped death so many times in the past was killed instantly. The race ended quietly with von Trips winning in front of Bonnier.

On Sunday morning, the day of the big race, rain was still falling from the heavy clouds and a cold wind blew over Berlin. Although it didn't discourage the public from filling the area surrounding the track, Behra's death and the rain certainly depressed the drivers. I have never seen such tense faces among the teams as they reached the track; there was none of the usual horseplay and joking, as drivers were constantly reminded of Behra's fatal accident on the banking. Fortunately the rain stopped at noon and by the time of the Grand Prix, the track was dry. The race was to be held in two heats of 154.74 mi each, with a half-hour break between in order to look after the cars. Naturally, rain or not, the race was to be held—in spite of much talk against it among the drivers and directors the night before. Drivers were instructed that if it did rain, a yellow signal would be given to indicate that there would be no passing on the curve and that they must not go higher than the yellow line one third of the way up the banking.

Just before the start, the drivers were permitted to drive three reconnaissance laps, which was a good idea. There were a couple of changes on the starting line: due to Behra's accident, Porsche retired its cars and Allison and Burgess replaced them. The 15 Formula I cars took off in a perfect manner and after one lap the order was Brooks, Moss, Brabham and Gregory, with three Coopers following a Ferrari. The race was off to an exciting start. The other Ferraris reacted promptly, however, and when Moss retired on the 2nd lap (with a broken transmission), three red cars—Brooks's, Gurney's and Phil Hill's—charged into the lead. That was enough to shake off Brabham but not the fearless little Gregory, who pushed his foot down even harder and surprised everyone by moving into the lead at the end of the 3rd lap. For the next 45 long minutes we were to wit- (continued on page 86)

On the starting grid: Brooks, Moss, Gurney and Brabham.



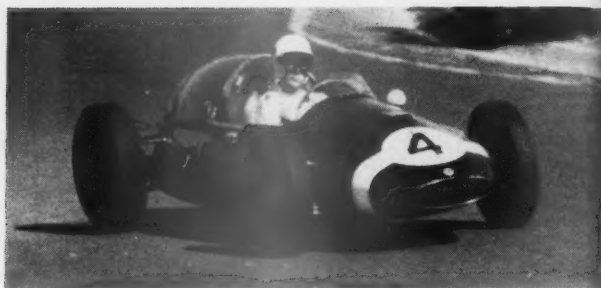
Grand Prix of Portugal

STORY AND PHOTOS BY BERNARD CAHIER

AFTER THE SAD, gray days at Avus in Berlin, drivers, journalists and racing enthusiasts were certainly happy to move south to Lisbon and the wonderful sunshine. The occasion of our gathering in Lisbon was the Grand Prix of Portugal, 6th Grande Epreuve of 1959. The circuit was the Circuito de Monsanto, on the outskirts of Lisbon. This circuit, 3.38 miles in length, is a beautiful course which belongs in the category of "drivers' circuits." It is medium fast, partly made up of public roads, and occasionally dangerous, due to off-course obstacles.

Sixteen cars were selected for this Grand Prix, which was to be run at a distance of 209.4 miles. After a leave of absence at Avus, Aston Martin was back at Portugal with two cars driven by Salvadori and Shelby. Ferrari had entered three cars with Brooks, Phil Hill and Gurney; Cooper had three cars with Brabham, McLaren and Gregory; Rob Walker had two Coopers for Moss and Trintignant; BRM entered three cars driven by Schell, Bonnier and Flockhart; Lotus had two cars with Graham Hill and Ireland; and to complete the list, Centro Sud had one Cooper-Maserati and the new Portuguese driver, Cabral. Brooks' car had a new engine (first tested in Allison's car at Avus) but the other Ferraris had no changes except for more streamlined noses.

Only 2 short practice sessions were held, and on both occasions Moss proved to be the master of the course. Moss recorded a lap of 2 min 2.8 sec (97.1 mph), over 2 sec quicker than Brabham, who made the second best time in 2 min 4.9 sec. Masten Gregory was third with 2 min 6.3 sec, exactly one sec ahead of Trintignant. Bonnier made fifth best time with his BRM, in 2 min. 7.8 sec,



Moss casually waves while drifting the Cooper-Climax.

and was the first non-Cooper. Gurney, the quickest man of the Ferrari team, made 2 min 7.9 sec, followed by Phil Hill, McLaren, Schell and Brooks, who, surprisingly, couldn't do better than 2 min 10.9 sec. The Aston Martin looked good on the turns during practice sessions, but it lacked speed. This explains the time of 2 min 13.2 and 13.5 sec for Salvadori and Shelby. Newcomer Cabral recorded 2 min 15 sec, a faster time than the two works Lotuses.

Because of an 86° temperature, the race was started at 5 P.M. in front of a big crowd, which had been following practice laps with tremendous enthusiasm. The race started in very smooth style and although Brabham shot out of the grid first it was Moss who was well in the lead at the end of the first lap, followed by McLaren, Gurney and Trintignant.

Stirling's determination on this first lap was obvious, and brought the crowd to its feet in excitement. So far this season he had been trying to be very careful of his cars, even at the cost of not being among the leaders in the first part of a race, always playing the game very coolly and wisely. But nearly every time, something has robbed him of a sure victory, putting him practically out of the running for the World Championship. Now, with no more obligations to himself for the title, Stirling was running just the type of flat-out race he has always loved, up in front and giving a lesson to everyone. Six laps later, when he took time out to look behind him down the long stretch of the freeway, he was already alone.

After half an hour of racing Brabham was over half a minute behind Moss, and Gregory trailed at 35 sec. McLaren was at 44 sec and Gurney-Trintignant were traveling wheel to wheel, at 48 sec. Four cars were already out of the race, Bonnier with fuel pump trouble, Ireland with gearbox trouble and the two Hills, Graham and Phil, both out after a collision. Several cars had already been lapped by Moss, among them Ferrari's first driver, Tony Brooks, who, in addition to trouble with locking brakes, was definitely not having one of his good days. By now Moss's superiority was so evident that attention was turned to the other drivers behind him. After a moderate start, an unusual thing for him, Gregory had moved up from 4th to 3rd, past McLaren, and was now challenging Brabham, his team leader.

The race was only 50 min old and it seemed that the thing for Brabham to do was to let Gregory by and let the American have a go at Stirling. Instead, Brabham stayed in front of Gregory, going noticeably faster than before. On one of the difficult bends in the forest, Brabham tried to pass another car, overdid things and left the road, hitting some hay bales and a pole. His car turned over several times, throwing him onto the track. Brabham seemed to be unconscious, but Gregory's arrival, complete with locked brakes and screaming tires, must have been a terrific tonic for Jack. He raised up, as from the dead, and ran off the side of the road, to the great relief of Gregory.

STARTING GRID

MOSS (Cooper-Climax) 2 min 2.89 sec	BRABHAM (Cooper-Climax) 2 min 4.95 sec	GREGORY (Cooper-Climax) 2 min 6.33 sec
TRINTIGNANT (Cooper-Climax) 2 min 7.38 sec	BONNIER (BRM) 2 min 7.86 sec	
GURNEY (Ferrari) 2 min 7.99 sec	P. HILL (Ferrari) 2 min 8.02 sec	McLAREN (Cooper-Climax) 2 min 8.17 sec
SHELL (BRM) 2 min 9.08 sec	BROOKS (Ferrari) 2 min 10.96 sec	
FLOCKHART (BRM) 2 min 10.98 sec	SALVADORI (Aston Martin) 2 min 13.28 sec	SHELBY (Aston Martin) 2 min 13.58 sec
CABRAL (Cooper-Maserati) 2 min 15.25 sec	G. HILL (Lotus) 2 min 15.55 sec	
IRELAND (Lotus) 2 min 18.47 sec		

FINAL PLACINGS

1 Stirling Moss	Cooper-Climax	2:11.55.4
2 Masten Gregory	Cooper-Climax	2:12.01.5
3 Dan Gurney	Ferrari	2:13.52.8
4 Maurice Trintignant	Cooper-Climax	2:12.57.1
5 Harry Schell	BRM	2:12.28.6
6 Roy Salvadori	Aston Martin	2:13.28.6
7 Ron Flockhart	BRM	2:13.49.9

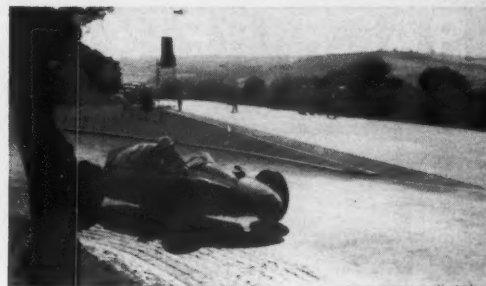
(Fastest lap: Moss, 2 min 5.07 sec)



A study in concentration: Dan Gurney.



Schell, and BRM, at the "Bonnier baths."



Gregory's Cooper enters the freeway.

After an hour the race had settled down and up front, well over a minute in the lead, was Moss, followed by Gregory. Farther back were McLaren, Gurney and Trintignant, the latter two having a wonderful go. Flockhart was 6th, having passed teammate Schell, who was showing the way to the two Aston Martins and to Brooks's Ferrari. We had reached the half-way mark and unless something unforeseen happened, it was clear that even Gregory's well known fighting spirit was not enough to threaten Moss's victory. The low sun was hitting the burning track very hard, making things extremely painful for the drivers. I was then at a slow corner with Joakim Bonnier, who had abandoned his BRM nearby. Moved by Gregory's pleas for water, we asked an official to obtain water and bottles for us. He eventually brought us, with some help, a total of 3 jerry cans. We gave Masten the OK signal and the next lap around I handed him a bottle. As he accelerated away I could see him drinking from it with a great deal of enjoyment.

That was only the beginning, however, as other drivers must have seen what was going on and soon Bonnier and I were busy supplying mineral water and shower baths. We had a little problem with the shower business as we had no suitable container, and a jerry can was hardly the thing for it. Suddenly my eyes lit on Joe's white helmet lying on the grass. Joe must have felt something coming, but before he had time to make a move the helmet was filled to the top. His first fears of shrinkage were soon overcome by the perfection of this handy shower giver. Our first customer after Gregory was Moss, then came Schell, Trintignant, Shelby and Cabral. Needless to say, they weren't satisfied with one bath apiece, and slowed down almost to a stop several times for our cooling treatment.

The Bonnier-Cahier "Drive-in Shower Service" was very successful and we were almost hurt not to see Salvadori or Gurney stop for our services. They were both too engrossed in their work to take much notice at our corner. Brooks didn't stop either, being very busy trying not to be last in the race, but every time he came around we could see him licking his chops with envy. The whole thing was very amusing and Bonnier forgot his chagrin at having had to retire. The thanks of many go to the kind officials, as without them I don't know where we would have found all the water!

That job kept us busy for a good hour and it was during that time that McLaren had to abandon, not because of water in his engine, as might be imagined, but because of transmission trouble. Gurney and Trintignant moved up into 3rd and 4th places. It was during this second hour of racing that Trintignant lost contact with Gurney after being almost overcome by the heat. Trintignant had made the mistake of staying close behind Gurney, getting the heat from Gurney's car as well as his own. Behind them there were very few changes, but Schell had retaken his teammate Flockhart and was now lying 5th, ahead of Salvadori. Flockhart was 7th, and Shelby 8th, Brooks 9th

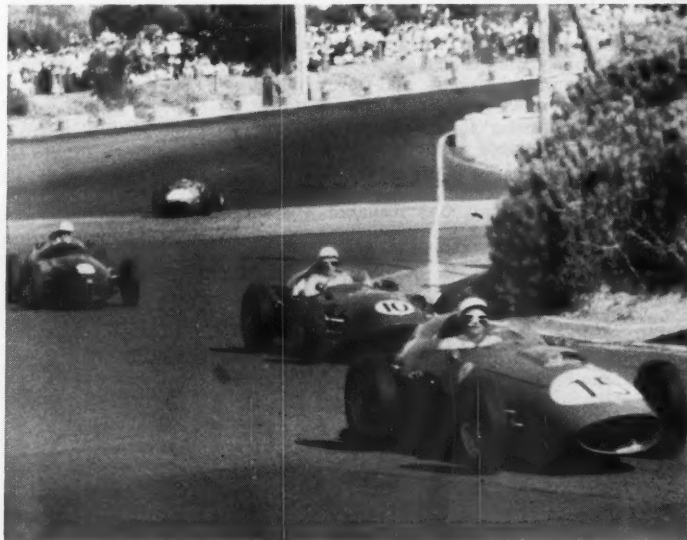
and, to the pleasure of the Portuguese fans, Cabral 10th.

During the second part of the race Moss's domination was so absolute and the other places were so spread out that all the stops they made for water did not seem to make any difference in positions, except perhaps for Gurney, Salvadori and Brooks who undoubtedly thought that their non-stop lapping might improve their places. Time went by very quickly during that second half, and when we suddenly realized that there were only a few minutes left to go in the race, we closed up shop and headed back toward the pits. The race ended without any further changes in positions, with Moss lapping Gregory and Gurney crumpling the Ferrari's nose as he was trying to lap Trintignant. Gurney was lucky indeed to have this incident happen so late in the race, as the air could no longer reach his radiator and his car became overheated. He had to cover the last three laps very slowly, with Trintignant coming on fast.

As we reached the pits there was a tremendous ovation. Moss had just finished, at last winning his first Grande Epreuve of the season. On the eve of the important Monza GP, Moss has only 17.5 points, as against 27 for Brabham and 23 for Brooks, so Moss has little chance of becoming World Champion this year. But the fact remains that with or without a title Moss is the champion driver of the year and the true successor to Fangio.

The Portuguese GP was not among the most exciting races we have seen this season, but at least the best man won, the weather was wonderful, and the general atmosphere extremely relaxed and pleasant. It was just the sort of place and race we would like to find everywhere. ☐

Hill, Shelby, Flockhart; Ferrari, Aston Martin, BRM.



RACE REPORTS



RICHARD SCHUMER

Ward takes to the shoulder and passes Constantine on the inside.

LIME ROCK USAC RACE

WHEN Rodger Ward, leading U.S. track chauffeur, entered the USAC-sponsored Formule Libre race at Lime Rock, Conn., the trouncing handed some of our top road course competitors sent *aficionados* rushing to their crystal balls to see what lies ahead.

Ward, driving an 11-year-old, 1.7-liter Meyer-Drake-powered midget, began his assault by lowering the course record a half second during qualifying runs. Modifications to the midget, usually run on an oval track, consisted of different camshafts and altered torsion bar loading to give better distribution for the left- and right-hand turns. Other midgets entered were driven by Tony Bettenhausen, Russ Klar, Bert Brooks and Duane Carter.

Adding to the strange sight of track midgets running against sports cars were a Formula I Maserati, an F-II Cooper and the new F-II Jomar (ROAD & TRACK, October) driven by Chuck Daigh, Lance Reventlow and Ray Saidel, respectively.

George Constantine, who until then was dominating the Lime Rock course, was at the wheel of Elisha Walker's 4.2-liter Aston Martin DBR-2. John Fitch, Lime Rock's competition director, was aboard a just-off-the-boat Cooper Monaco. Add Pedro Rodriguez in a 3-liter Maserati, Denise McCluggage in an RS Porsche, Bob Columbusian in a 2-liter Lister-Bristol, Dick Thompson in the Sting Ray Chevy, plus other potent iron, and you have a pretty wild starting grid.

The events were divided into two 20-lap heats and a 60-lap feature. Qualifying runs were made in the best professional tradition, and when Ward recorded 1 min 4.67 sec, jaws dropped and heads were scratched. Constantine managed 1 min 5.66 sec, and Daigh looked strained as he got the old Maserati around in 1 min 6.28 sec. Fitch, Reventlow, Klar and Rodriguez trailed in that order.

As the flag dropped for the flying start of the first heat, Constantine and Daigh headed for the corner together and promptly pulled ahead of the field. As soon as Ward could gather some torque in the high-revving engine, he shot out after the pair. The midget's superlative power and roadability soon became apparent to even the most inexperienced observer as Ward caught Daigh and then began inching up on Constantine.

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Aside from fully exploiting the car's advantages in the turns and in the esses, Ward also proved it could accelerate out of the corners at a rate equal to that of the Aston. His only disadvantage lay in decelerating at the end of the straightaway, where the sports and Formula cars could go in considerably deeper.

But Constantine, driving one of the best races of his career, clung desperately to his precarious lead. If there were mistakes to be made, George was not going to be the culprit.

Daigh, meanwhile, managed to hold his own in 3rd aboard the ex-Fangio-ex-Bonnier car that already had two GP seasons under its wheels. Purchased by the Camoradi U.S.A. team, this was its initial venture. And if the crew-cut Californian appeared uncomfortable in this strange (for him) mount, Constantine and Ward weren't making his lot any easier. At the checker, Constantine had a scant 2-sec lead on the midget, while Chuck tagged home almost a half minute later.

Fitch was 4th, followed by Rodriguez and Reventlow in 5th and 6th, after a race-long, nose-to-tail duel. The teenage Mexican had observers holding their breath as he came off the downhill turn time after time with the Maserati crossed up. What he lacked in smoothness he more than made up for with his right foot. Reventlow hung on doggedly but was unable to muster enough pressure in the Cooper to pass. Russ Klar brought the 2nd midget across the line in 7th spot. Thompson was next with the Sting Ray, constantly plagued by brake and handling problems throughout the entire race.

Daigh finished 2nd in a Maserati best suited for a longer course.



WARREN BALLARD

force on his diminutive charger, and the Walker-owned Aston had so far been the most reliable mount of the season. Daigh seemed to be adjusting better to the F-I car on each lap, and Fitch was not to be discounted.

The eager field almost over-ran the Mercedes pace car getting off for the big one. Constantine made sure he was first into the turn, but Ward and Daigh were hounding him hard. George managed to grab a little space as Daigh occupied Ward by sticking the long snout of the Maser past the midget on every turn, finally getting by him on the 5th lap. Fitch went into the pits, and Rodriguez moved into 4th with Reventlow only inches behind.

Pouring on the coal, Daigh started to move up on Constantine, then into the lead on lap 11. Rodriguez bobbed slightly on the next lap and Reventlow latched onto 4th place. Denise McCluggage eased her RS into 7th and Daigh, now showing signs of tiring, relinquished his hard-won lead to Constantine. Ward was playing the waiting game.

At this point the tide took an unexpected turn. Constantine suddenly pulled into the pits with a wobbling rear wheel. A crushed axle stub and bearing put the Aston out of the race, and Ward passed Daigh into the lead.

On the 26th lap Daigh again moved into the lead and Rodger seemed content to let him go, at least for the time being. Bettenhausen, now far back in the pack, ran completely out of brakes, fishtailing the full length of the pits before bringing the midget to a stop. Denise McCluggage caught a rock on her goggles and, with the left lens completely smashed, dropped back to 12th position.

As the race passed the halfway point, Fitch really turned loose his Cooper Monaco, trying to gain the few seconds lost during his early pit stop. Using his intimate knowledge of the track, he began creeping up through the pack, cutting his lap times to the leaders'. By now both Ward and Daigh had lapped the field, but the pace never slackened.

Going into the last 10 laps Ward made his bid, closing the gap, then passing Daigh to take a firm lead. Chuck continued to fight, but the midget eased almost effortlessly ahead. Fitch was now closing in rapidly on Rodriguez and Reventlow was dropping back as the Climax got tired.



Three Triumphs at speed on the beautiful new Westwood, B.C., circuit.

On the 58th lap Pedro and John moved into 3rd and 4th, respectively. Fitch immediately went in deeper at the end of the straight, passing the Maser in the corner. But the youngster just as quickly pulled a trick out of his own bag, ducking under in the esses and leaving Fitch with no road to run on. Both throwing rev limits to the wind, they screamed over the finish line, Pedro scant inches ahead. Columbusian got the Lister across in 5th, and Reventlow finished in 6th.

Ward's win was a walk-away, but many observers still wore dazed expressions of disbelief. These were no schoolboys with go-karts he'd run away from. True, the tight Lime Rock plant is more hospitable to midgets than some other sportscar circuits, but obviously the circuit would have to have a much higher average speed than Lime Rock does in order for road machines to be safe from this little threat.

Ward was using methanol fuel, but at a sacrifice in weight because his relative fuel load had to be greater than that of his competitors (due to the high consumption rate of methanol). There are many factors that can and will be weighed and argued over and over again. The conclusions, however, must remain the same: here was a championship driver in a well prepared, highly perfected piece of equipment. They simply proved to be a winning combination and as long as rolling starts are used, this is a combination that will be hard to beat.

—Warren Ballard

SCCBC WESTWOOD OPENER

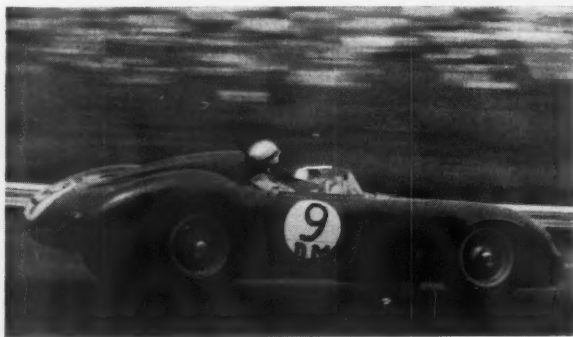
A crowd of more than 15,000 turned out on Sunday, July 26, to watch the opening events at the Sports Car Club of British Columbia's Westwood Racing Circuit (see map, page 65). Beautiful weather, an entry list of just under 100 cars ranging from Berkeleys to Ferraris, and some first-rate driving made this the best event ever held on Canada's west coast.

The tight, tricky course put all the drivers on their mettle, particularly those in the bigger cars. It was immediately obvious that the Westwood course called for a different type of driving from that of an airport circuit. The sort of minor bobble that would be insignificant on an airport could be extremely dangerous here.

Practice began on Friday evening and continued through Saturday and Sunday morning. Even though the drivers soon learned to treat the course with respect, there were a few crashes before the weekend was over. There was no permanent damage to the drivers.

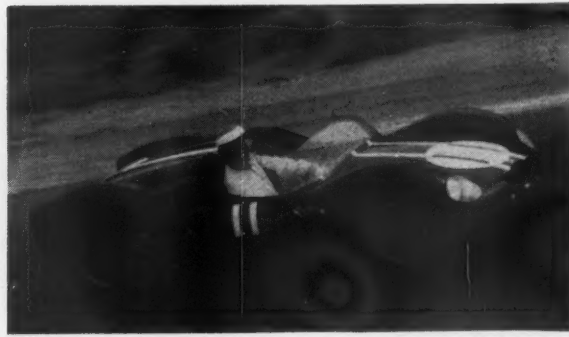
Racing started with a 10-lap event for classes H and I production. It should be explained that these classes are set by the International Conference of Northwest Sports Car Clubs, and are based on power to weight ratio. The Abarth-modified Fiat 600's of McCune and Scott set the pace. Just past the halfway mark McCune retired, leaving Scott to take

Rodriguez brakes the Maserati for the horseshoe bend.



WARREN BALLARD

John Fitch, Lime Rock manager, in the new Cooper Monaco.



first place, followed by a TD and an Austin-Healey Sprite. Scott's average speed was 58 mph.

The 2nd race for class G production was an MG-A affair except for a lone Alfa Romeo 1300 at the rear. Local driver John Hall grabbed the lead on the first turn and held it for the 10 laps. His average was 64 mph.

The TR-2's and TR-3's had it all over the Austin-Healeys in the next race, for E and F production. After 15 laps Charles McKaig led a string of TR-3's home at an average speed of 64 mph.

American driver Tom Luse led the way in his Corvette in the 15-lap race for classes A, B, C and D production. He averaged 68.2 mph and made one lap at over 70 mph. James Parsons and Kenneth Miller took 2nd and 3rd places, both in AC-Bristols.

The next race, 15 laps for under-1500-cc-modified (simple displacement formula), demonstrated the character of this course. Pete Lovely in a 1500-cc twin-cam Lotus and the ex-Lovely "Pooper" driven by Tom Meehan roared away from everything else and put on a delightful show, the Pooper leading the way. By the third lap Lovely got tired of the Pooper's exhaust fumes and, pushing the Lotus up to 135 mph on the main straight, passed the Pooper. During this lap Lovely established the course record at 1 min 26 sec, which is equal to 75.6 mph. He said later that he thought he could knock a second off that if the need arose.

The over-1500-cc-modified race of 15 laps was a pitched battle among the Ferraris of Becker and Keck and Rattenbury's D-Jaguar. The hairpin at the end of the straight seemed to be the stumbling block for the bigger cars, but they put on a magnificent show of acceleration climbing up through the Esses. It was very close all the way, the final order being: Becker, 2-liter Ferrari; Rattenbury, D-Jag, and Keck, 3-liter Ferrari. Becker's average for the race was 72.7 mph.

The feature race of the day, a 15-lap event with a Le Mans-type start, for all classes, began with a disappointment: Becker, Lovely and Meehan did not enter.

Photo taken from Westwood spectator area shows good view of course.



DON LEBLANC

Westwood from the air. Scenic splendor is readily apparent.

It would have been very interesting to see Lovely and Meehan mixing it up with cars having twice the displacement of their own.

Keck's 3-liter Ferrari took the lead on the first lap, followed closely by Rattenbury in the D-Jag. Keck stayed ahead for the entire race, but Rattenbury was a constant threat. Jim Rattenbury had made some modifications to his car which improved the performance and then had taken full advantage of the three days of practice. This was certainly the best drive he has ever given the Jag.

Keck averaged 73.7 mph in winning, with Rattenbury a close second, averaging 73.6 mph. The best lap for both of them was 74.6 mph. Tom Luse averaged 70.5 mph in his 3rd-place Corvette.

The Westwood circuit is 1.8 mi long and 26 ft wide. From the starting line it climbs up to a fast left bend which leads into the banked right turn, the Carousel. From here it drops down to the left hand Clubhouse corner, 0.4 mi from the start, and continues downhill to the sweeping right-hand Valley Corner curve. This leads to the 3800-foot-long Mountain straight, which starts downhill but climbs suddenly at Deer Leap, then a right hair-

pin, and up one half mile through the Esses to the finish. The circuit follows the natural contour of the land and the Carousel is more than 500 ft above the lowest part of the course, Deer Leap.

This course favors the smaller cars and the general comment of the drivers was "hairy." Pete Lovely, who established the lap record, said the circuit is similar to Monaco, but of course without the buildings or harbor. Westwood is also very hard on brakes.

The first event at Westwood was a success. A carnival spirit prevailed in the crowd, many of whom had not seen a race of any kind for more than a year. The excitement of watching real road racing was new to most of them (as compared to airport circuits), and the spectators standing above the turns could look right into the cars and watch the drivers, all in complete safety.

There were a few things wrong. A bad bump in the Carousel turn troubled some of the drivers, but this is to be corrected. The snow fencing left stains on clothing and the road from the highway was very bad in spots. These minor irritations will also get sorted out before long.

Considering this was the first race at a new track, the organization was outstanding. The opening ceremonies were delayed, but the races went off one after the other without too many long pauses. The public address system was well handled and the crowd control was carried out effectively with a minimum of "herding."

Westwood is a first-class circuit for both drivers and spectators. The present development is only the first stage of a plan to build a circuit equalling Europe's best, not only in the course proper, but also in pit facilities and spectator accommodation.

—R. L. Simpson

THOMPSON, CONN., LISCA RACES

There were some good, close races at Thompson on August 16, but that slim, blonde girl from New York caused all the preceding manly efforts to pale when she fought out the feature race with a good friend—male—and beat him by a hood-length.

JAMES QUIN

The girl, of course, was Denise McCluggage, and the friend is Gordon MacKenzie. Both are among the top Eastern drivers, and they provided the race of the day in a full card sponsored by the Long Island Sports Car Association.

MacKenzie got off to a fast start when the flag fell, his seven-year old C-Jag acting like a kid again. Joseph Grimaldi, in a D-Jag, took off right after him, with Denise, in her Porsche RS, riding right along. Denise has tried several cars here and there, but always seems to come back to Porsches. She certainly proved it was the right choice for this race.

The races were 15-lappers around the 2-mi course, and it took Denise half the distance to get by Grimaldi so she could have a go at MacKenzie. The latter had put so much ground between himself and Grimaldi that the task looked hopeless—except, apparently, to Denise. It soon became evident, even without a stop watch, that she was turning in better lap times than Gordon, and about 4 laps from the end she stormed by the pits a half-dozen car lengths behind. She caught him sooner than anyone expected (especially MacKenzie), outbraking and outcornering the Jag through the double 90.

For the next couple of laps she widened the gap, but then MacKenzie apparently got over his surprise and hopped on it again. They came around on the lap before the checkered flag with the Jag's grille about even with the Porsche's rear wheels, and the final lap was even closer.

Art Tattersall, driving a Volvo special in another class in the same race, nearly became a factor in the outcome. Miss McCluggage and MacKenzie lapped him at the southeast turn, and Tat was on his way up the hill out of the corner before he could get out of the way. Both faster cars got around, however, and took the flag side by side, Denise ahead by about the length of the Porsche's hood. Tattersall won his class and Grimaldi, some distance behind, was 3rd over all.

Another friendly duel was fought by Charlie Rainville and Chris Noyes, Rainville's young protégé, in their Alfas. When the flag fell, both simply left the rest of the field behind. They came around the first 2 turns way out front, Rainville having accelerated just a mite better than Noyes, and still about a foot in front of him. That's the story of the race, except for one little incident at the southeast turn when Chris nudged the nose of his Alfa into the rear of Charlie's car. Nothing serious, mind you; just enough to jiggle the battery in the trunk. They finished in that order: Rainville, Noyes 2nd by about a foot, and Ralph Troiano Jr., of Manhasset, N.Y., a not-so-close 3rd.

Rainville didn't make a mistake all the way around, and he couldn't afford to, for, as Art Peck said over the public address system, Noyes is one of the best natural drivers seen in these parts in a long time.

Driving a superb race without benefit of practice, Chandler Lawrence brought his exceptionally well kept Porsche Super Speedster through for an easy first in the event for Porsches and twin-cam MG-A's. Lawrence was at Lime Rock the day before, where he came in 6th over all (Lit-

tle Le Mans) in a Saab 93-B. Chandler is his own mechanic, and his Porsche goes and sounds as if he knows what he is doing. First man home among the twin-cam MG's was N. de St. Croix of Verdon, Que.

The Healey race provided quite a bit of excitement, especially at station 4 (the 2nd left turn of the double 90). Flagmen and officials had several nervous moments when John Murray, of Bedford, Mass., spun his Healey completely around right in the middle of the track as he came out of the corner. He was running 5th over all in the event, which also included Corvettes, Jag 120's and 140's and a Mercedes 300-SL coupe. Murray was alone when it happened, but a heavy batch of traffic was following about 100 yd behind. The track is just slightly uphill as you come into the corner, and a driver entering it can't see what has hap-

ly not too badly damaged either on its way in, but getting it out of the mire into which it sank by the end of the race was another matter.

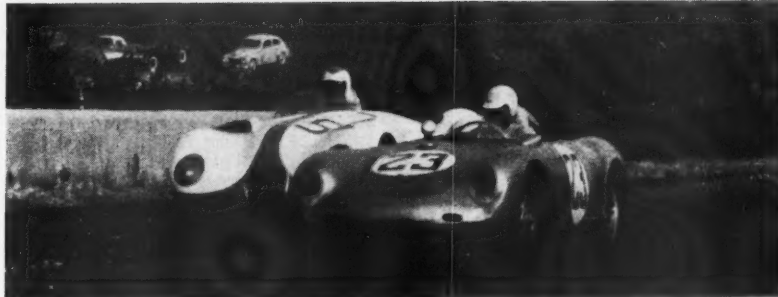
First over all in this race went to Tom Kerr, of Mystic, Conn., who always provides formidable competition. For a while, he had a close rival in Al Tinker, of Elmont, N.Y., but in the late laps, Tinker's Corvette started steaming. It was a scorcher of a day to begin with, the temperature ranging near 95°, and the steam that came through Tinker's cockpit must have made it a hot ride. Naturally he lost ground, but he came in 2nd, feeling like a gentleman who's just emerged from a Turkish bath. The winner, Tom Kerr, and 3rd-place man Fred Abel also drove Corvettes.

Top man among the Healeys was Frank Gorman of Manhasset, N.Y., followed by Bob Davidson of Belton, Conn.,

Swing your partner, dos à dos, promenade all . . . at Thompson.



KEN PARKER



Near photo finish at Thompson, featuring McCluggage and MacKenzie.

pened on the far side of the hill.

He sat there as the flagmen almost turned somersaults with the yellow flag. A couple of cars came through, one to the right, the other on the left; then came the bunch. Suddenly there were cars everywhere, and Murray, who had now jumped out, was trying to drag his car backwards off the track. As soon as they could get out there, everyone in the corner but a flagman and the phoneman rushed out and helped. He got safely off but left a patch of oil about the size of a Healey hood.

In the same race, Stephan Bresnahan of Brooklyn, running last, came around the left-hand turn 7, hit the sand and corrected. And how he corrected! He shot right across the track to the left and sailed 50 ft into a brush-filled swamp about 6 ft below track level. He was not hurt, and the AC-Bristol was miraculously

and Mary Flockton of New York.

A race for the "poor man" included Volkos, Sprites, Turners, a swarm of Saabs and a pair not seen on a sports-car course in the East for many moons: a VW and a TD.

First over all were three Volkos, driven by Eric Elfstrom (loyalty, you know) of Brooklyn, Garry Ross of Montreal and Pennell Odell of Matawan, N.J. In the next class in this event, it was Morley Boyd of Fairfield, Conn. (Sprite), Dolph DuMont of New York (Turner) and Clem Bernard of Somerset, Mass. (Sprite). The final class of this race went to Richard Moody of West Berne, N.Y. (Saab) and John Chrabolewski of Hempstead, N.Y., in—yes, that's right—the VW.

In the race for pushrod MG's, it was Fred Coon of New Britain, Conn., Michael Falcone of (continued on page 90)

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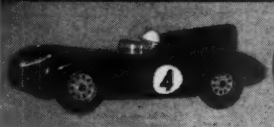
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CORVAIR ROAD TEST

continued from page 30

little just after a standing start, but the fault was our own—it needs revs a little higher than expected to avoid this when trying hard for best possible acceleration.

In connection with the brakes the Corvaire's weight distribution works to excellent advantage, because rapid deceleration puts more weight on the front wheels. The net result is that total braking effort is very close to 50/50, front to rear.

A pistol grip handbrake of conventional type is used, but the release mechanism is of an entirely new kind which we think extremely clever and worthwhile. When the handbrake is applied, a dash knob pops out a distance of about 2 in. This gives visual indication that the brakes are applied. The knob is not pushed in to release the brakes, as you might expect. Instead the knob must first be pulled before it will release. This action was chosen to avoid accidentally releasing the brakes.

A technical description of the Corvaire appears on earlier pages of this issue, but it is interesting to note that this is the first modern American car to offer these features:

- 1) Independent rear suspension
- 2) Transaxle
- 3) Aluminum engine
- 4) Air cooling (engine)
- 5) Rear mounting (engine)

The latter two items cause a problem which was not overlooked—the difficulty of getting sufficient heat into the car's interior. On the Corvaire we find a specially designed heater located inside the forward luggage compartment. This burns gasoline and provides heat and/or defrosting almost instantly in any weather. Fuel consumption at maximum heat is about 1/4 gal./hr, but on a normal winter day the rate is seldom higher than 1/10 gal./hr.

Another problem with rear-mounted engines is finding enough luggage space. The forward compartment has a volume of 9.8 cu ft, not including the spare wheel and tire. A well behind the rear seat back adds 4.5 cu ft, giving a total of 14.3. In addition, an optional folding rear seat is available. This provides 10.4 cu ft, including the well, inside the vehicle for a total capacity of 20.2 cu ft.

Other accessories are available including the usual de luxe trim items, seat covers and belts, radio and automatic transmission. But there's nothing else—no power brakes, power steering, power seats. This is wonderful and, for a low-priced car at least, a return to sanity. In fact, the Corvaire is a sane, sensible, well designed car of a type we've been asking for for 10 years. Now that it's here, we think even Chevrolet will be pleasantly surprised by the demand for it—and be working overtime to supply cars.

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WINGARD MIRRORS



SPRING-LOADED WING MIRROR

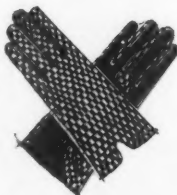
For fender, door or cowl. Encased spring mechanism allows mirror to ride accidental blows and return to pre-set position at a touch. 4 3/8" diam. Double-dipped chrome finish. Flat glass, \$4 each, \$7.75 pair. Convex glass, \$4.25 each, \$8.25 pair.

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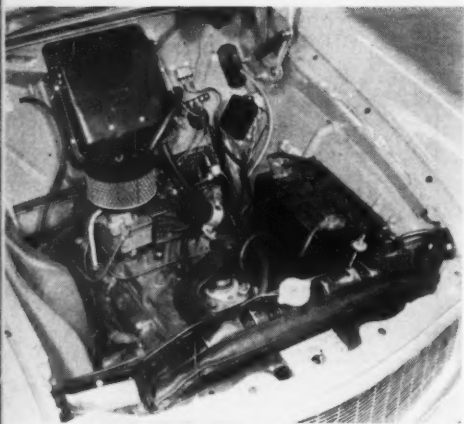
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TUNE-UP CLINIC

Tuning and modifying the first of the U.S. compacts

BY BILL COREY



The American's side-valve engine will respond happily to wise tuning.

NOW THAT the compact-car market has been invaded in force by domestic manufacturers, Road & Track intends to take a long look at these cars, analyze their performance, and investigate various means of improvement.

It seems only fair, however, to talk first about the granddaddy of them all, the Rambler American, before examining the Corvair, the Falcon and the Valiant. The Lark will also be included at a later date.

At 2475 lb, the American weighs in at slightly more than the Corvair and considerably less than the Valiant. According to our information, the Falcon and the Lark VI heft about the same, within a few pounds of the American. The Rambler has one big advantage: an engine of considerably larger displacement (195.6 cu in.). True, it is not a modern engine in the sense of ultra-short-stroke, ohv design. Nevertheless, it is endowed with gobs of torque, is extremely smooth and quiet, and possesses an enviable record of trouble-free service. Much the same can be said of the Lark VI engine.

To increase the performance of this car, one must bear in mind that in stock form it is in a relatively high degree of tune and, since its breathing is limited by combustion chamber configuration, there is not much point in increasing compression ratio or adding carburetors. The cam, although mild, takes advantage of every good engineering trick to achieve excellent mid-range torque and good economy. Therefore, our advice is to leave this engine untouched and, if

you want more performance, consider the purchase of a series 5910 Rambler 6 engine. This model is of identical physical size and displacement, but features overhead valves, an 8.7:1 compression ratio, and optional dual carburetion. These changes to the basic block assembly add up to 37 more bhp and 50 more lb-ft of torque. It is doubtful if even the most extensive modification to the side-valve engine could equal the output of the 5910 ohv. This additional power is the function of larger intake valves, larger exhaust valves, heavier valve springs, higher valve lift, higher compression and a different camshaft. (Strangely enough, though, the ohv engine cam has less overlap than that used in the side-valve design.) One other change which contributes to the added performance is an exhaust system with a larger cross section. The heat rejection characteristics of the ohv type are probably better too, since the cooling system requires one qt less water. A higher-output coil is also specified, and the advance curve of the distributor is drastically different.

From all of the preceding, it doesn't take much imagination to visualize that an American with an ohv engine installed could be quite a little bomb. The cost should be fairly moderate, particularly if the change were made at purchase time. I am certain that there are a number of dealers who could be persuaded to make a very reasonable change-over deal.

Other modifications which might be advisable would be the installation of 6.40-15 tires in place of the standard 5.90-15, changing the wheel revs per mile from 790 to 765. This is advised if the car is equipped with overdrive and a 3.78:1 axle ratio. If either the standard transmission (without overdrive) or automatic transmission is desired, my advice would be to use the stock tire size. Brake drums are identical in diameter on all Rambler 6's but the shoes are $\frac{1}{4}$ and $\frac{1}{2}$ in. wider in front on the larger car. With this minor improvement in total area, I can see no reason for replacement.

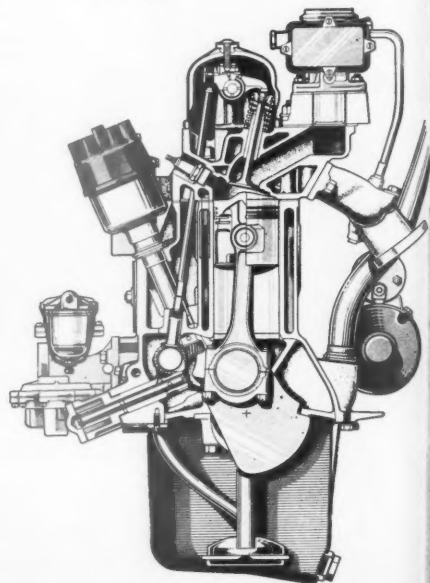
The vast majority of Rambler American owners or prospective owners who read this column won't want to make any modification to their cars, either because of cost or simply because they are quite satisfied with the performance of the 90-bhp engine. Nevertheless, I'm certain they will want to obtain each and every pony developed, so here are some tuning specifications of interest.

The cylinder head should be tightened to 60 lb-ft, starting with the center stud of the center row. No's. 2, 3 and 4 are the ones toward the rear of the engine, in that order, and 5, 6 and 7 are the ones in the center row toward the front of the engine. Next is No. 8, which is directly beside No. 1, then 9, 10 and 11 to the front and 12, 13 and 14 to the rear. No. 15 is diagonally to the rear of No. 1, and then 16, 17 and 18 are to the rear. Tightening is completed by torquing 19, 20, 21 and 22 to the front. All manifold flange nuts should be tightened, and compression checked with the throttle wide open. The minimum per-

missible is 140 psi, and variations of more than 10 psi between cylinders should be suspect. The firing order is 1-5-3-6-2-4, point gap is .016 in. (28-35° dwell) and plugs should be set at .035-in. gap. When tuning Ramblers we usually use Lodge CSN spark plugs because of their broad heat range characteristic, but, regardless of the plugs used, clean and oil the threads properly and install to a torque setting of 30 lb-ft. The static timing setting is 3° BTDC, which is checked on the front crankshaft vibration damper. Valve clearance seldom requires attention on side-valve engines, but I suggest checking at least once in the early life of the car. Specifications are .016-in. clearance for intake valves and .018 in. for exhaust valves. Measurements are taken with a cold engine. If facilities are available to check the distributor, there should be no advance before 850 rpm; the maximum advance is 14° at 4000 rpm. The vacuum unit should not start operation before 5 in. and its maximum should be 11° at 11 in. Breaker arm tension should be 21 oz.

The standard carburetor is a Carter YF-2014-S single barrel with automatic choke and is equipped with a paper air cleaner. Fuel pressure to the carburetor should fall within outside limits of 4 and 5.5 psi. This model Carter is of straight-forward design and repair kits are available nearly everywhere. Dirt is seldom a problem, since the car is equipped with a highly effective paper disc and magnet fuel filter. The carburetor has only two external adjustments, one for idle speed and one for idle mixture. If troubles are encountered with carburetion it is highly unlikely that these two adjustments can correct the situation. Space is not available this issue but, if sufficient inquiries are received, we will be happy to include complete carburetor cleaning, repair, calibration and adjustment details in a future article. □

An even better but costlier step is to install the ohv engine.



SEBRING 1959



RLP 5014 Monaural \$5.95
RLP 1146 Stereo \$5.95

America's greatest sports car race brought to you in two amazing LP releases. **SOUNDS OF SEBRING 1959**—the sounds and voices—with on-the-spot reports of this greatest sports car regatta (it sure rained at Sebring this year). And in addition we set up our microphones on the Warehouse straight and succeeded in surpassing all of our previous recording efforts. **SPORTS CARS AT SEBRING IN HI-FI** (or **STEREO**) bring you the fantastic sounds of up and down shifting, accelerating and braking of all the cars, including DB, MG, Austin-Healey, Porsche, Ferrari, Aston Martin, Maserati and Lister Jag. Just pure sounds. Both releases available in monaural and stereophonic.

Peter Ustinov, a sports and racing car devotee of long standing has taken a close look at our popular Sports Car Series and has come up with a devastating parody of his own. Creating all sounds and voices himself, Ustinov satirizes all that we hold dear and familiar in the world of racing. Hear the exciting sounds of the Fanfani, Schnorcedes, America's own Wildfowl, the Orgini etc. Thrill to the Le Mans start, interviews with Bill Dill, Girling Foss, World Champion Fandango and other drivers you know so well. Wives, sweethearts and friends who have never understood our records will love this one.



RLP 5012 \$5.95

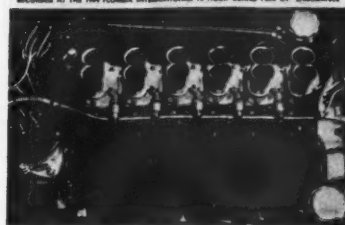
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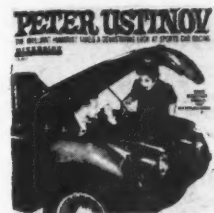
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| 5003 Pit Stop | 5007 Marquis de Portago | 5013 Vintage Sports Cars in Hi-Fi |
| 5004 Stirling Moss | 5008/9 Sounds of Sebring 1957 | 1115 Vintage Sports Cars in Stereo |

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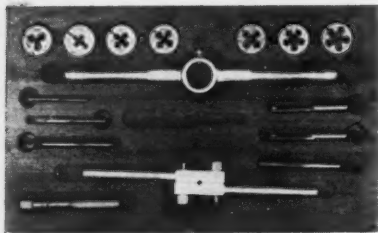
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17 to 22 mm. 1.19	32 mm.....1.92
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BOOK REVIEWS

SOUPING THE VOLKSWAGEN By Dick Morgan, Floyd Clymer, Los Angeles, Calif. \$3.00

It is generally known, I think, that the Volkswagenwerk Gmbh. frowns on those who would tinker with this "perfect" product for economical motoring.

Automobile enthusiasts, and American enthusiasts in particular, don't go along with this buy-it-and-leave-it-alone attitude, regardless of the designer or builder. Consequently, it was natural that the VW would sooner or later come under the speculative eye of the domestic speed merchants.

We've known for some time that VW performance kits were on the market (Mag and Judson superchargers, Okrasa and Dietz modification kits, Weber stroked cranks, Abarth mufflers, etc.), but to our knowledge this is the first book dealing with VW modifications only.

In addition to explaining how to get more power from the VW engine, the book contains a section on trouble shooting which applies to any VW. It also includes a motoring dictionary with 200 words in English, French, German and Italian.

Morgan appears (to me, at least) a bit over-optimistic about the ultimate performance of a modified VW, and yet his advice on modifications seems to be well thought out and in line with general hopping-up techniques.

According to him (though he seems well aware of the VW's shortcomings), the acceleration of a modified VW compares favorably with that of a Volvo, MG-A or Porsche 1600. Be that as it may, any VW owner who wants more performance would do well to read the book before tackling the job. It might save a few headaches and many dollars.

RACES THAT SHOOK THE WORLD By Rodney Walkerly, Sports Car Press, New York, N.Y. \$2.75

Using a thoroughly Americanized title, the sports editor of *The Motor*, in England, has recounted nine outstanding European races that were milestones in automotive history.

Included in the list are the 1903 Paris-Madrid race; the French Grand Prix of 1914; Le Mans 1930, with the victorious Bentley; the German Grand Prix of 1935, in which Nuvolari, hopelessly outclassed, still managed to defeat full teams from Auto Union and Mercedes; the German Grand Prix of 1938, won by Dick Seaman; the BRMs' victory at Albi, France; Le Mans 1955, and the tragic accident; the 1957 Monza 500, in which contemporary U.S. racing cars were seen in Europe for the first time, and finally the now famous duel between Juan Fangio and the late Mike Hawthorn at Reims in 1953.

The book is not overly technical, but there is no need for it to be so. All the incidents are memorable ones, told by an expert, and they will be valuable in the collection of any amateur automotive historian.—D.B.

RECORD REVIEWS

SPORTS CARS AT SEBRING IN HI-FI, Riverside Records, RLP 5015, \$5.95 and RLP 1144 (Stereo), \$5.95

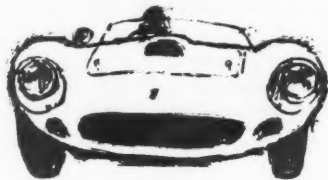
Starting out with *Sounds of Sebring* in 1956 (RLP 5001), the Riverside recording group, under the direction of Bill Grauer and Barrett Clark, now has available its latest offerings, recorded in the rain at Sebring in 1959.

The technical quality, as always, is very good and the infinite variety of sounds really comes through. As a matter of fact, it sounds as though the cars are coming through your living room, to the occasional consternation of wives and unlightened friends.

The main thing that sets a race like Sebring apart from Indianapolis (from a recording standpoint) is the vast number of different engine sounds. At Sebring you'll hear 2-cyl, 4-cyl in-line, V-type and opposed, 6-cyl and V-12 engines. At Indianapolis you'll only hear one, or possibly two, V-8's; the rest of the 33-car starting field is made up of almost identical 4-cyl in-line engines.

This record has no narration, so the cars can be identified only by their sounds, plus a little help from the album jacket notes by Barrett Clark. Now I find, to my chagrin, that it isn't so easy to identify the cars from their different sounds. Most listeners would appreciate the help of narration.

The noise, so adeptly recorded by the Riverside sound team, is crisp and clear and the accelerating Ferraris give the impression that they could break windows and crack plaster if the volume were turned up. But the continual roar



of engines with little let-up for 40 minutes (both sides) tends to become dull for all except the die-hard enthusiast.

This record is not meant as a replacement for *Sounds of Sebring*, but is an addition to the usual race recordings done by Riverside Records each year.

SOUNDS OF SEBRING 1959, Riverside Records, RLP 5014, \$5.95 and RLP 1146 (Stereo), \$5.95

Each year since 1956, the Riverside Records crew has been at Sebring and subsequently has brought out *Sounds of Sebring* for the listening enjoyment of sports-car enthusiasts and hi-fi fans.

There has been a gradual improvement in both quality and presentation, subject of course to the circumstances at each race. The sound quality on this record is surprisingly good for the dismal conditions at Sebring this year.

Following the pattern established by previous *Sounds of Sebring* records, one side consists of interviews (von Hanstein, McCluggage, Fitch, Barth, Hill, Bonnier, Shelby, Cunningham, Moss, von Trips,

Gurney, Allison, Parnell and Daigh). The other side describes the race, including the start, finish and some of the pit stops.

The interviews are rather short but all of the drivers have something interesting to contribute. Daigh, especially, has a classic bit that every Porsche owner in the country will probably memorize and repeat during any minor conversation lull.

I, for one, would like to swap a little of the conversation for some of the straight car sounds of *Sports Cars at Sebring*, which would give each record a little better balance. Nevertheless, everyone who has enjoyed the prior Sebring records will want to add this to his collection.

Riverside records are available through most record stores or from the manufacturer, Riverside Records, 553 W. 51st St., New York, N. Y. They are 33 $\frac{1}{3}$ -rpm long-play records and playing time is approximately 20 minutes per side.

BRITISH RACING DRIVERS' CLUB 19th British Empire Trophy Race 1957, Stanley Schofield Sound Stories, EP 503, \$3.95

The British Empire Trophy, which has a somewhat varied history, is now run on the Oulton Park circuit in Cheshire. It is a sports-car race run in three separate heats, with the cars divided into relative engine sizes. Because all three heats are of equal distance, no run-off is required, final placings being determined by the time required for each car to complete the necessary laps.

Due to the nature of the circuit, which places strong emphasis on brakes and road holding, no handicap system is employed and it is felt that the composite result is fair to all.

I feel that this is not one of the most interesting Schofield records, but it does give an insight into one phase of British racing. The sound recording, as usual, is very good and the record is a 45-rpm extended-play. Total playing time is approximately 14 minutes.

We have had many requests for this company's address. Stanley Schofield records can be obtained from the U.S. importer, Grand Prix Records, 724 S. Lake St., Burbank, Calif. Other Schofield records were reviewed in our June, August and September issues.

THE SEXUAL SYMBOLISM OF THE AMERICAN AUTOMOBILE, MEA Records, Sausalito, Calif., \$1.49

This is a very unusual record, and not everyone will want it. It consists entirely of a "speech" on the American car, delivered by Dr. S. I. Hayakawa, Professor of Semantics at the University of California.

Listeners who expect a dirty record will be disappointed. Dr. Hayakawa very eloquently pans the designers, builders, salesmen and buyers of the cars behind the chrome curtain, but this is like many speeches; you may be glad you've heard it, but you won't be heartbroken if you don't hear it again. He's flogging an already moribund horse.—D. B.

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GERMAN GRAND PRIX

continued from page 73

ness a sensational duel between Gregory and the whole Ferrari team. Positions were changing all the time, with "David" Gregory being attacked by one after the other of the three Goliaths. But unperturbable Gregory was keeping up with them, often taking the lead, to the great joy of the public. Amazingly, the first to drop back a bit was Phil Hill, who preferred to play it more safely and wait, leaving Brooks and Gurney to fight with Gregory for first place. Everyone was surprised to see Gregory's Cooper last so long at this high pace against the powerful Ferraris. It finally happened at the end of the straight; while being pulled by the Ferraris and at an unknown number of rpm, his engine blew out with a tremendous roar and Gregory, besides being the hero of the day, could claim the dubious distinction of being the first driver capable of putting a large hole in a Coventry-Climax engine this season.

During the Gregory vs. Ferrari battle, another battle, equally as exciting, was being fought between the BRM's of Bonnier, Schell and Herrmann, the Coopers of Trintignant and McLaren, and Graham Hill's Lotus. Those six were to change positions frequently until, near the end of the heat, Graham Hill broke his transmission and Herrmann dropped back slightly from the group. The decisive moment in the fight occurred when the Ferraris, at last rid of the troublesome Gregory, lapped the others. In doing so they picked up McLaren, who got into a strong air current behind them and quickly left behind the disgusted trio of Trintignant, Schell and Bonnier. The heat ended a few laps later with McLaren, although a lap behind, still tailing Brooks and Gurney. Phil Hill finished 3rd, a little farther behind, while Trintignant and Schell were having a dead-heat finish wheel-to-wheel ahead of Bonnier and Herrmann. Brooks's average for this first heat was 146.69 mph and he also made the lap record for the day in 2 min 4.5 sec at 149.15 mph!

Among the casualties of this record-breaking heat were Brabham, whose clutch disintegrated after a few laps, and Allison, who also had clutch trouble early in the race. Of the few cars left at the end of this heat, most needed some attention. Schell's clutch was out and he was wondering how to start again. Amazingly, in spite of the terrific speed, no tires were changed. It was a good point in favor of Dunlop, which equipped all the Formula I cars that day.

The 2nd heat had a very small starting grid with only three Ferraris, two Cooper-Climaxes, one Cooper-Maserati and three BRM's. Allison and Graham Hill tried to enter again but they were refused as they had not been able to complete the first heat. This 2nd and final heat went very smoothly, forming quickly into two groups. The three Ferraris took off as a single car, leaving everyone behind, but a stubborn little bee was with them: a Cooper driven by McLaren. McLaren fought hard for several laps against the red cars, then



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dropped out of the race with engine trouble after putting on a gallant fight. This left the prancing horses to trade places among themselves at will in a true demonstration of team superiority. A little way behind, Trintignant and Bonnier were animating the race by exchanging places on almost every lap. It was clear, however, that Trintignant was playing with Bonnier and that he would have no trouble in taking him for good at the end. As it turned out he didn't even have to make that effort, as Bonnier had to make a quick pit stop to change a plug. Schell was circulating slowly with his clutchless car and Herrmann, who had so far put on a good show with his BRM, suddenly found himself coming into the hairpin braking zone at 180 mph—without brakes. Shifting down quickly didn't help much and the car, after hitting some haybales, looped three times and disintegrated. Herrmann was fortunately thrown out on the first loop and was picked up from the debris on the track, badly bruised but otherwise all right.

That was the last incident of this tense day of racing, and a few minutes after Herrmann's spectacular accident, Brooks was triumphantly crossing the finish line followed closely by Phil Hill, Dan Gurney and, at a surprisingly close 14 sec, Trintignant, who had driven a superb race with his underpowered Cooper. Bonnier was 5th and Burgess, who had done very well with his Cooper-Maserati, was 6th. Harry Schell finally managed to be

7th by pushing his car across the finish line after a courageous drive.


As expected, the Ferrari had won an overwhelming victory, showing everyone that nothing can approach them on fast courses for speed or lasting quality. The only man who seemed to understand this at Avus was Trintignant, and he was well rewarded by his splendid 4th place. As



always, Brooks had driven a first-class race, terribly fast but always cool and in full control of the situation.

Gurney found himself in 2nd place in the over all standings after his second GP. Gurney is really good but still a bit too rough. His car had traces of two shunts with Gregory, souvenirs of that earlier battle. Experience should smooth him out and will help him learn to avoid this type of incident. Phil Hill was an excellent 3rd after an intelligent wait-and-see race. Phil told us after the race that his tachometer was reading as high as 8800 rpm—some 500 rpm over the red line—while he was slip-streaming Gregory. Fearing that his engine couldn't take it, he finally let the others go. It was a wise decision in his case.

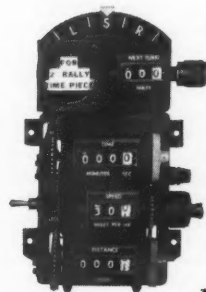
Everyone was happy to see this Avus race end without further tragedy. The drivers had done their duty all the way, but all of us hope that Avus will never again be used for the Formula I cars, which are primarily built to be used on a true road-type circuit. Under the circumstances, we cannot really blame the AVD Club for having the race in Berlin. They meant well, but we also hope they will understand now the dangerous absurdity of Avus and that next year we will find ourselves seeing the German Grand Prix at the Nurburg Ring, or even on the pretty circuit of Solitude near Stuttgart.

Our next *Grande Epreuve* will be the GP of Portugal at Lisbon, where we hope warm sunshine and a nice course will help us forget this black weekend which deprived us of another comrade. 

FINAL RESULTS

1. Brooks (England)	Ferrari	at 143.343 mph
2. Gurney (USA)	Ferrari	at 143.312 mph
3. Phil Hill (USA)	Ferrari	at 142.171 mph
4. Trintignant (France)	Cooper	at 140.402 mph
5. Bonnier (Sweden)	BRM	at 137.993 mph
6. Burgess (England)	Cooper-Maserati	at 132.709 mph
7. Schell (USA)	BRM	at 114.463 mph
(Fastest lap: Brooks in the first heat		at 149.154 mph)
2 min 4.5 sec		

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IN CANADA

continued from page 57

every farm along the highway displays a sign offering something "A vendre" or "A louer" (for sale or to let), betokening a cordial attitude towards a reasonable business proposition. A working knowledge of Quebec French helps in attempts to bargain, but a U.S. plate on the car will do well as an initial ice breaker.

For the Ford fancier, Cape Tormentine, N.B., is a small paradise. This tiny town, existing almost solely by grace of the ferry to Prince Edward Island, seems to have been put on wheels with the advent of the Model A Ford and to have remained unchanged ever since. Tourists and transients drive cars of every description, but the town motive power seems to be one yard locomotive for the ferry, and the balance Model A's.

This is, of course, an extreme situation. However, it is not unreasonable to expect that the collector visiting the Maritime provinces of Canada will find an area offering a greater chance of securing restorable machinery than the heavily picked-over spots he has investigated in the past.

One caution, however, on this point: the Maritimes have never been wealthy, and pickings will probably be limited to makes that originally carried lower price tags. A Packard would be hard to find, but chances could be quite good for a Ford seeker. Meanwhile, it is a beautiful spot for a holiday.

We were out to the Mosport property recently for the first time. The total tract amounts to 450 acres and, though somewhat irregularly shaped, it seems to be about a mile along the north-south axis and around 3/5 of a mile wide.

Three or four spring-fed creeks run across the property, and there are natural sites for small dams that would provide pleasant swimming pools for visitors. The land is hilly and rolling.

The entrance is in the northeast corner of the property. To the left as one enters is a long avenue of trees, offering shady parking for a long line of cars. Steep hills rise from the sand and gravel soil, interspersed with clumps of shade trees.

From many of the hilltops it is possible to see almost all of the property, which slopes gradually towards the south. In the far distance, Lake Ontario reflects the sunlight of a clear day. In the northwest corner a high rise shelters an eroded sandbank that will undoubtedly prove exceptionally popular with small children (and their harried parents) when racing commences. Almost all of the land is covered with coarse grass, and clumps of wild flowers dot the hillside.

The site is naturally suited to race course building. Even an absolute minimum-expense venture, following the natural course of the gullies to minimize grading expenses, would provide a 3-mi circuit of which at least 2 mi would be visible to spectators at all times. It would also include sweeping upgrades and downgrades, bends, and tricky left- and right-hand corners.

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RAMBLINGS

continued from page 21

mph. That was enough to heat a 7-room house and was caused by passing the exhaust ports all the way through the block. The modern ohv engine with short exhaust ports and high-compression produces much less heat than earlier units—which may surprise a few people who (mistakenly) think high compression means higher temperatures.

You can also calculate heat losses on the basis of BTU input (from the fuel) and allow 30 to 35% as the amount of heat dissipated through the cooling system. A car that gets 10 mpg at 60 mph will need twice as much cooling as one that gets 20 mpg at the same speed. On that basis, some modern cars with multiple power-consuming gadgets definitely need better cooling systems. These are the cars one sees pulled off to the side on mountain grades.

NEW FROM EUROPE

continued from page 49

further; a new dished steering wheel has been adopted; a combination switch on the steering column actuates turn indicators, headlight dimming and enables headlight flashing in daytime.


The floor shift lever has been retained but is bent back toward the driver, who can sit back comfortably. The already magnificent ring-type synchromesh has been further refined and represents probably the most advanced design of its kind.

The body has been improved in detail, and there are now two separate rear seat back rests so that when there is only one rear passenger, the remainder of the rear compartment remains useful for luggage. The steering wheel and all control knobs are now finished uniformly in black to minimize reflections in the windshield.

The engine range has been enlarged by the introduction of a new version of the 1600 Super. The new engine, which carries the type number 616/7, has the same cylinder dimensions as its predecessor: 82.5-mm bore and 74-mm stroke (1582 cc). But due to new carburetors (Solex 40-P-II-4), improved induction through larger valves, rocker arms giving higher valve lift and a compression ratio raised from 8.5 to 9:1, the maximum power is now 90 (D.I.N.) bhp at 5500 rpm. For short periods 6000 rpm can be reached and at the same time, flexibility and torque in the lower speed range have remained unimpaired so that the Super 90 should be particularly good for safe passing.

The new range, which will be identified by the type number 356-B, now contains all the body styles with a choice of the following engines: the Normal 1600, the 1600 Super, and the Super 90. Apart from the body changes, introduced in all models, the Carrera will remain unchanged.

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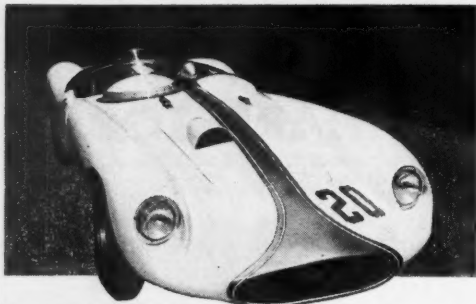
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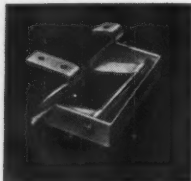
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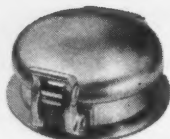
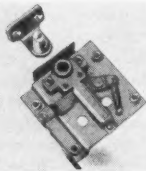


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RACE REPORTS

continued from page 79

Lincoln, R.I., and Earl Simpson of Avon, Conn.

The organization of the meet left a little something to be desired, but the Long Island group, while large for an independent, can't be compared with SCCA for staging races and considering its youth it did very well.—Ken Parker

COURTLAND, ALA.

The 2nd day of Courtland's 5th annual speed weekend could easily be called E. D. Martin Day, as the easy-going pilot from Columbus, Ga., rode off with the checkered flag in the two hottest events of the afternoon.

Starter Jesse Coleman waved the group forward in the 80-mile main event, the Governor's Trophy Race. Martin let a couple of cars get ahead of him temporarily, then caught them in the next few laps. Inge Johnstone, driving his 2-liter Testa Rossa Ferrari, gave it all he had in the initial laps and kept ahead of the bigger car until Martin decided to get out of the traffic and put his foot into the Webers.

White cord was beginning to show in Johnstone's left rear tire, but he apparently didn't get the word and pulled a spectacular spin-out in the right angle turn coming off the 5000 foot back straight as the tire blew. He limped back to the pits, however, for a tire change, then continued the race.

C. K. Thompson's D-Jaguar went out half-way through the race with a bad connecting rod, and six other cars suffered retirement before the race was over. Meanwhile, back in the pack, Dick Macon in a stage 3 Lotus XI moved up to disturb the leaders until a mistaken pit signal brought him in and cancelled the chances of this excellent driver. Bill McCorkle in a Corvette took 2nd while Johnstone, who had made a wonderful comeback after his pit stop for a tire, was in 3rd. Martin, of course, made off with first place, averaging 83.4 mph.

Martin also availed himself of a win in the C and E modified 15-lapper, run earlier in the day. Bill Burroughs, driving Johnstone's bright red Modena machine, took 2nd, while C. K. Thompson's son Powell got 3rd in the family Jag.

In a mixed event for smaller classes, Bill Knowe took first overall and a class win in a stage 2 Lotus XI, while Joe Thompson placed and was first in class with his Porsche Speedster. Alfred Dawley was 3rd overall and first in G production with his Alfa Veloce.

The previous day's events, taken up with practice, novice race and powder-puff derby, saw a deluge almost cover the track when it was time for the ladies' outing. It didn't seem to bother Audrey Saffell, who copped the honors in an Elva borrowed from the Atlanta Elva Racing Team. Smokey Drolet followed in 2nd place in an outlandish, orchid-colored Triumph, while Freddie Everette came in for 3rd berth in another TR-3. The following day, on dry pavement, the same group raced again, with the same results, but this time Audrey used McCorkle's Corvette to win.

The weekend's races had a bit of trouble getting off the ground this year, as the Alabama region of the SCCA and a local sponsoring group failed to get together at the last minute and the races were cancelled. Finally, the SCCA decided to do its own sponsoring and rescheduled the event, but a number of drivers with previous commitments had to be removed from the lists. —Sam Houston

MARLBORO SCCA REGIONAL

Young Roger Penske joined an exclusive Marlboro, Maryland, racing fraternity on Sunday, July 19th. In a Porsche RSK he beat Mrs. Harry Clark Boden's Lister-Chevy, driven by Fred Windridge, and thus became fraternally related to Bob Holbert and Don Sessler, two of the country's top RSK pilots who have done exactly the same thing.

The feature race can only be described as fantastic. In 25 laps the lead changed hands 43 times. In one lap the lead changed at least eight times. Some observers said 10. At the finish, in still anybody's race, Penske sneaked the blue-gray number 6 Porsche RSK past Windridge for the victory.

Penske, who a year ago was a novice, improves with each outing. In previous appearances at this southern Maryland track, he performed creditably in a Porsche Carrera. In his recently acquired RSK, Penske was simply brilliant.

The fans spent the whole race jumping to their feet every time the lead changed (which was quite often). They were so enthusiastic that only a few of the less hardy departed for shelter when a thunderstorm broke. Most of the spectators were cheering for the petite Porsche against the giant Lister. When Penske won by less than a car length, there was bedlam.

It was Porsche day at Marlboro. Out of seven races, Porsches won four. In semi-wind-up races, Gene Hobbs of Wheaton, Maryland, driving a finely set up Carrera, got by national F production point leader Harry Blanchard and Bruce Jennings, both in Porsche Carreras, to win a 15-lapper.

Frank Baptista added to his reputation as one of the best G modified drivers in the country by winning his race going away. He was pursued by teammate Art Tweedale. Both drove Elvas.

In one of the more amusing incidents of the day, Bud Dickson won a trophy donated by himself for the day's best novice performance. He spun his Elva twice but still came on to take an astonishing 2nd in the 2nd heat of the novice race. Ike Smith in a Corvette won. The first heat was won by Ray Gross in a Volkswagen special with a Devin fiberglass body.

Mike Rothchild, recently returned from France's 24 hours of endurance at Le Mans, drove Arch McNeill's Morgan to victory in the 2nd race. Two other drivers high up in the scrap for national points in their classes also did well. Pierre Mion took the E production class win in his AC-Bristol in the semi-feature. Reed Rollo took G class wins in the 4th heat and the semi-wind-up. Rollo had only Don Erlbeck to contend with in the 4th event, both in Alfas, until Erlbeck lost the clutch in his car. —John Travieso

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IN CANADA

continued from page 57

every farm along the highway displays a sign offering something "A vendre" or "A louer" (for sale or to let), betokening a cordial attitude towards a reasonable business proposition. A working knowledge of Quebec French helps in attempts to bargain, but a U.S. plate on the car will do well as an initial ice breaker.

For the Ford fancier, Cape Tormentine, N.B., is a small paradise. This tiny town, existing almost solely by grace of the ferry to Prince Edward Island, seems to have been put on wheels with the advent of the Model A Ford and to have remained unchanged ever since. Tourists and transients drive cars of every description, but the town motive power seems to be one yard locomotive for the ferry, and the balance Model A's.

This is, of course, an extreme situation. However, it is not unreasonable to expect that the collector visiting the Maritime provinces of Canada will find an area offering a greater chance of securing restorable machinery than the heavily picked-over spots he has investigated in the past.

One caution, however, on this point: the Maritimes have never been wealthy, and pickings will probably be limited to makes that originally carried lower price tags. A Packard would be hard to find, but chances could be quite good for a Ford seeker. Meanwhile, it is a beautiful spot for a holiday.

We were out to the Mosport property recently for the first time. The total tract amounts to 450 acres and, though somewhat irregularly shaped, it seems to be about a mile along the north-south axis and around 3/4 of a mile wide.

Three or four spring-fed creeks run across the property, and there are natural sites for small dams that would provide pleasant swimming pools for visitors. The land is hilly and rolling.

The entrance is in the northeast corner of the property. To the left as one enters is a long avenue of trees, offering shady parking for a long line of cars. Steep hills rise from the sand and gravel soil, interspersed with clumps of shade trees.

From many of the hilltops it is possible to see almost all of the property, which slopes gradually towards the south. In the far distance, Lake Ontario reflects the sunlight of a clear day. In the northwest corner a high rise shelters an eroded sandbank that will undoubtedly prove exceptionally popular with small children (and their harried parents) when racing commences. Almost all of the land is covered with coarse grass, and clumps of wild flowers dot the hillside.

The site is naturally suited to race course building. Even an absolute minimum-expense venture, following the natural course of the gullies to minimize grading expenses, would provide a 3-mi circuit of which at least 2 mi would be visible to spectators at all times. It would also include sweeping upgrades and downgrades, bends, and tricky left- and right-hand corners.

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RAMBLINGS

continued from page 21

mph. That was enough to heat a 7-room house and was caused by passing the exhaust ports all the way through the block. The modern ohv engine with short exhaust ports and high-compression produces much less heat than earlier units—which may surprise a few people who (mistakenly) think high compression means higher temperatures.

You can also calculate heat losses on the basis of BTU input (from the fuel) and allow 30 to 35% as the amount of heat dissipated through the cooling system. A car that gets 10 mpg at 60 mph will need twice as much cooling as one that gets 20 mpg at the same speed. On that basis, some modern cars with multiple power-consuming gadgets definitely need better cooling systems. These are the cars one sees pulled off to the side on mountain grades.

NEW FROM EUROPE

continued from page 49

further; a new dished steering wheel has been adopted; a combination switch on the steering column actuates turn indicators, headlight dimming and enables headlight flashing in daytime.

The floor shift lever has been retained but is bent back toward the driver, who can sit back comfortably. The already magnificent ring-type synchromesh has been further refined and represents probably the most advanced design of its kind.

The body has been improved in detail, and there are now two separate rear seat back rests so that when there is only one rear passenger, the remainder of the rear compartment remains useful for luggage. The steering wheel and all control knobs are now finished uniformly in black to minimize reflections in the windshield.

The engine range has been enlarged by the introduction of a new version of the 1600 Super. The new engine, which carries the type number 616/7, has the same cylinder dimensions as its predecessor: 82.5-mm bore and 74-mm stroke (1582 cc). But due to new carburetors (Solex 40-P-II-4), improved induction through larger valves, rocker arms giving higher valve lift and a compression ratio raised from 8.5 to 9:1, the maximum power is now 90 (D.I.N.) bhp at 5500 rpm. For short periods 6000 rpm can be reached and at the same time, flexibility and torque in the lower speed range have remained unimpaired so that the Super 90 should be particularly good for safe passing.

The new range, which will be identified by the type number 356-B, now contains all the body styles with a choice of the following engines: the Normal 1600, the 1600 Super, and the Super 90. Apart from the body changes, introduced in all models, the Carrera will remain unchanged.

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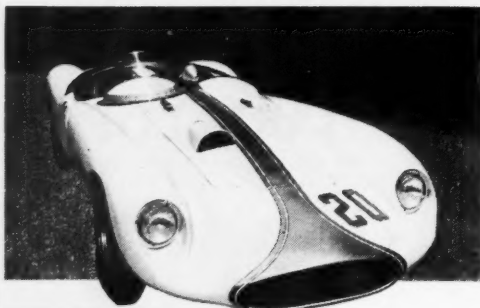
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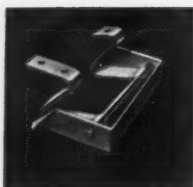
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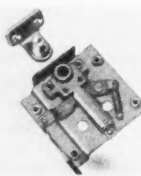
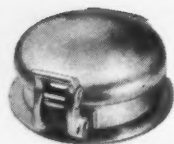


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RACE REPORTS

continued from page 79

Lincoln, R.I., and Earl Simpson of Avon, Conn.

The organization of the meet left a little something to be desired, but the Long Island group, while large for an independent, can't be compared with SCCA for staging races and considering its youth it did very well.—Ken Parker

COURTLAND, ALA.

The 2nd day of Courtland's 5th annual speed weekend could easily be called E. D. Martin Day, as the easy-going pilot from Columbus, Ga., rode off with the checkered flag in the two hottest events of the afternoon.

Starter Jesse Coleman waved the group forward in the 80-mile main event, the Governor's Trophy Race. Martin let a couple of cars get ahead of him temporarily, then caught them in the next few laps. Inge Johnstone, driving his 2-liter Testa Rossa Ferrari, gave it all he had in the initial laps and kept ahead of the bigger car until Martin decided to get out of the traffic and put his foot into the Webers.

White cord was beginning to show in Johnstone's left rear tire, but he apparently didn't get the word and pulled a spectacular spin-out in the right angle turn coming off the 5000 foot back straight as the tire blew. He limped back to the pits, however, for a tire change, then continued the race.

C. K. Thompson's D-Jaguar went out half-way through the race with a bad connecting rod, and six other cars suffered retirement before the race was over. Meanwhile, back in the pack, Dick Maccon in a stage 3 Lotus XI moved up to disturb the leaders until a mistaken pit signal brought him in and cancelled the chances of this excellent driver. Bill McCorkle in a Corvette took 2nd while Johnstone, who had made a wonderful comeback after his pit stop for a tire, was in 3rd. Martin, of course, made off with first place, averaging 83.4 mph.

Martin also availed himself of a win in the C and E modified 15-lapper, run earlier in the day. Bill Burroughs, driving Johnstone's bright red Modena machine, took 2nd, while C. K. Thompson's son Powell got 3rd in the family Jag.

In a mixed event for smaller classes, Bill Knowe took first overall and a class win in a stage 2 Lotus XI, while Joe Thompson placed and was first in class with his Porsche Speedster. Alfred Dawley was 3rd overall and first in G production with his Alfa Veloce.

The previous day's events, taken up with practice, novice race and powder-puff derby, saw a deluge almost cover the track when it was time for the ladies' outing. It didn't seem to bother Audrey Saffell, who copped the honors in an Elva borrowed from the Atlanta Elva Racing Team. Smokey Drolet followed in 2nd place in an outlandish, orchid-colored Triumph, while Freddie Everette came in for 3rd berth in another TR-3. The following day, on dry pavement, the same group raced again, with the same results, but this time Audrey used McCorkle's Corvette to win.

The weekend's races had a bit of trouble getting off the ground this year, as the Alabama region of the SCCA and a local sponsoring group failed to get together at the last minute and the races were cancelled. Finally, the SCCA decided to do its own sponsoring and rescheduled the event, but a number of drivers with previous commitments had to be removed from the lists. —Sam Houston

MARLBORO SCCA REGIONAL

Young Roger Penske joined an exclusive Marlboro, Maryland, racing fraternity on Sunday, July 19th. In a Porsche RSK he beat Mrs. Harry Clark Boden's Lister-Chevy, driven by Fred Windridge, and thus became fraternally related to Bob Holbert and Don Sessler, two of the country's top RSK pilots who have done exactly the same thing.

The feature race can only be described as fantastic. In 25 laps the lead changed hands 43 times. In one lap the lead changed at least eight times. Some observers said 10. At the finish, in still anybody's race, Penske sneaked the blue-gray number 6 Porsche RSK past Windridge for the victory.

Penske, who a year ago was a novice, improves with each outing. In previous appearances at this southern Maryland track, he performed creditably in a Porsche Carrera. In his recently acquired RSK, Penske was simply brilliant.

The fans spent the whole race jumping to their feet every time the lead changed (which was quite often). They were so enthusiastic that only a few of the less hardy departed for shelter when a thunderstorm broke. Most of the spectators were cheering for the petite Porsche against the giant Lister. When Penske won by less than a car length, there was bedlam.

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Frank Baptista added to his reputation as one of the best G modified drivers in the country by winning his race going away. He was pursued by teammate Art Tweedale. Both drove Elvas.

In one of the more amusing incidents of the day, Bud Dickson won a trophy donated by himself for the day's best novice performance. He spun his Elva twice but still came on to take an astonishing 2nd in the 2nd heat of the novice race. Ike Smith in a Corvette won. The first heat was won by Ray Gross in a Volkswagen special with a Devin fiberglass body.

Mike Rothchild, recently returned from France's 24 hours of endurance at Le Mans, drove Arch McNeill's Morgan to victory in the 2nd race. Two other drivers high up in the scrap for national points in their classes also did well. Pierre Mion took the E production class win in his AC-Bristol in the semi-feature. Reed Rollo took G class wins in the 4th heat and the semi-wind-up. Rollo had only Don Erlbeck to contend with in the 4th event, both in Alfas, until Erlbeck lost the clutch in his car. —John Travieso

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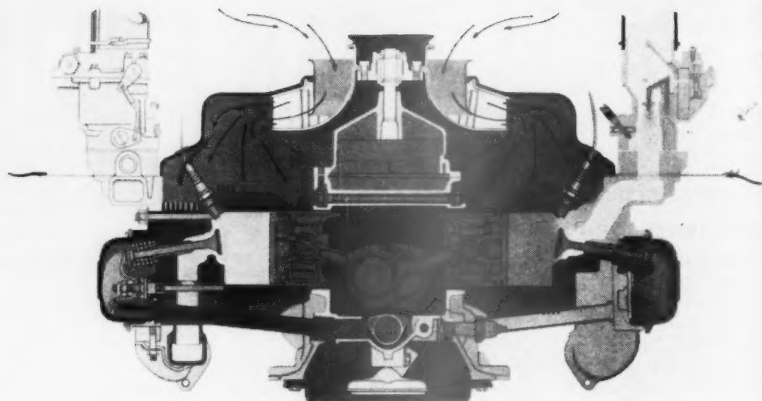
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The cooling system, showing ducting and flow patterns.

CORVAIR ANALYSIS

continued from page 27

oil cooler which doesn't begin to function until the oil temperature reaches 60° F. A red warning light on the instrument panel flashes low oil pressure or high temperature (300° F).

Engine cooling, of course, is by an 11 in. fan. This assembly sits flat on top of the engine and it runs 1.58 times crankshaft speed. There are 24 fan blades, arranged like a Sirocco-type blower and giving a rated output of 1800 cu ft/min at 4000 rpm of the crankshaft. The fan shaft bearing is a sealed double-row ball of the type commonly used in water pumps. No scroll or diffuser is used with this fan. It merely discharges into a plenum chamber, which in turn supplies air to the proper places. A thermostat and spoiler ring give quick warmups by cutting off the fan inlet when the engine is cold. No air circulates until the temperature reaches 180° F.

The fan drive is quite fantastic, with its unusual right angle turns, but it works.

Since the engine turns counter-clockwise when viewed from the rear of the car, the tension side of the belt runs over the generator pulley.

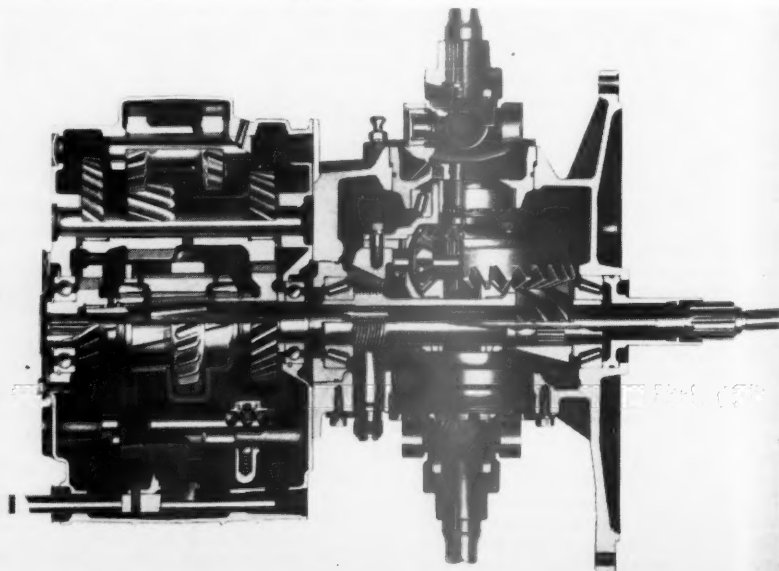
Carburetion is by two 1.25-in. down-draft carburetors. These mount directly on the intake manifolds, which are cast integral with the heads. Large-diameter molded-rubber hoses (with an internal spring to prevent collapse) connect the carburetors to a central air cleaner. The automatic choke is unusual in that it functions at the air cleaner intake.

As already mentioned, the exhaust system consists of a short tube pressed into each port. A simple counterbored casting serves as a collector, and clamps serve to hold the whole works together. A single reverse-flow muffler is used, located along the right-hand side.

The Clutch

Of traditional Chevrolet-Inland design (since 1938), the Corvaire clutch uses a diaphragm-type spring with 18 fingers and a nominal load of 975 lb. The driven disc has a 9.125-in. diameter and no cushion center. Since there is no long

A cutaway top view of the three-speed manual transmission.

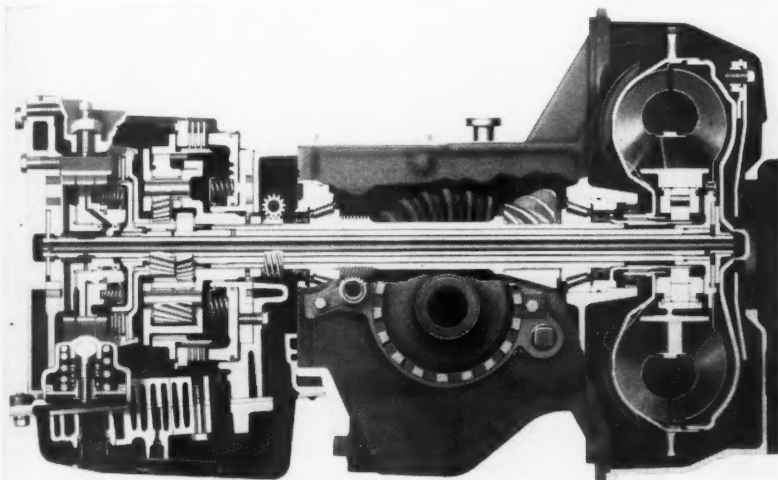


propeller shaft to absorb torque irregularities and back-lash at low speeds, the clutch drives the input end of the transmission (at far left in illustration) by means of a long torsion bar. This bar has a minimum o.d. of .625 in. for an effective length of just over 17 in. It winds up about 9° at full throttle, or even more under severe jerk conditions. This provides all the cushion needed, and it obviously works very well.

The standard 3-speed-and-reverse transmission is quite remarkable, for it uses a great many standard parts from the larger cars. In effect, Chevrolet has taken the old reliable unit and merely turned it inside out so that the long, slender torsion driving shaft enters at the output end and

clutch and has an effective diameter of 10 in. It gives a torque multiplication of 2.6:1. The transmission proper uses many standard parts from the larger car's unit and provides low gear (1.82:1), direct drive and reverse. Unlike Powerglide, the Corvaire unit uses a large-diameter multiple-plate clutch to hold reverse. This eliminates a servo band, but such a band (or brake) is still used to engage low gear. A 4-plate clutch connects the input and output for direct drive. Parts common to the large-car assembly include most of the clutch components, front and rear oil pumps, governor, planetary gears and some valve body parts.

Tracing the power flow in the accompanying illustration looks difficult but is



Auto-transmission, differential, and torque converter.

passes all the way through to the main drive gear. Only this gear and its mating countershaft gear are different from the larger transmission. Parts common to both the Corvaire and the big cars include the main 2nd/3rd-gear shift sleeve, all synchro cones, the sliding low gear, the mainshaft 2nd-speed gear and reverse idler gears. Since the main drive gear is special anyway, it has fewer teeth. This accounts for the higher numerical ratios in first and 2nd gears, even though these gears are the same as on the big 6 and V-8. The torsion bar driving member allows all this and in addition gives a direct drive for high, which is very desirable for quiet and efficiency. This unit, with aluminum case, is said to weigh only 30 lb.

The aluminum transmission case bolts directly to a cast-iron differential housing, this latter material being quite essential to insure proper bearing pre-load (and gear tooth contact) under all conceivable conditions of load and temperature. The differential gears are the latest high-offset hypoid type, with a 6.75-in. ring gear. The standard axle ratio is 32:9 (3.555:1) with an option of 35:9 (3.888:1).

The automatic transmission option is essentially the firm's well known Powerglide, but with many changes. The torque converter replaces the usual flywheel and

not, once it is noted that the smallest hollow shaft inside is not part of the power train. Its sole purpose is to connect the engine to the front oil pump. No. 2 hollow shaft connects the converter to the input end of the transmission (at far left in the illustration). Transmission output is via No. 3 hollow shaft, which surrounds the other two, and which mounts the separate differential drive pinion. One interesting difference is in lubrication. The differential uses regular EP lube, while the automatic transmission case carries its own separate supply of standard non-foaming oil.

Though the Corvaire abounds in interesting ideas, it actually has nothing particularly new, or unknown, or untried. We predict a tremendous public acceptance for this car, literally America's "Folks Wagon."



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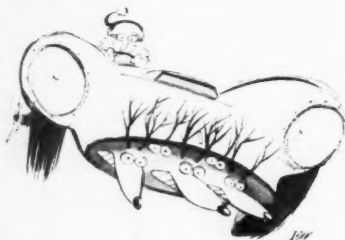
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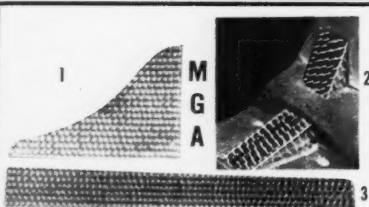


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RALLY ROUND THE FLAGMAN, BOYS

continued from page 67

identify the excellent drivers, the competent ones, and those who seem to be constantly on the verge of fouling up. The excellent and competent drivers need only normal attention as they go through the corner. When one of the unpredictable drivers approaches, the flagman must spot him and be prepared for action.

This means that the flagman must be a pessimist, at least for the duration of a race. He must expect the worst each time a car approaches his corner. Needless to say, he is delighted when he is wrong.

Am I overstressing the direness of the picture? A car approaching a corner at a speed of 110 mph is moving at the rate of 161.3 ft/sec. Therefore, if the flagman is just one half second slow getting the flag out, the car actually will have traveled 80.7 ft. That figure doesn't include the driver's reaction time. It's the distance the car will travel before anything at all can be done. That distance, if lost at the start by an inattentive flagman, can mean the difference between a close call and bent machinery, or worse.

The flagman must learn to spot trouble while it is still developing. He must start moving if he is to be on top of the situation when it breaks. This requires at least a fair knowledge of each driver and his capabilities. One driver can hold his car in the same situation that would install another sideways in the corner, the flagman's nightmare (and, I suspect, the driver's also).

The flagman must not unnecessarily delay the race, but he must maintain safety. Racing, after all, is a chancy undertaking. The drivers realize this, as do the flagmen. Nothing is more infuriating to a driver than to be all set to make his move on a corner and then have to back off because a flagman misjudged a situation and blew the whistle needlessly. The flagman must use the very best judgment in deciding whether it is better to play it safe and put the flag out, or let 'em go. This requires the ability to make split-second decisions on exactly no notice and make the right ones. If he puts out the flag and it isn't necessary he will have the drivers marching up and down his spine. If he doesn't use the flag and he is wrong, well . . .

One might infer that the flagman has a decidedly responsible job. One might also think, from the number of different jobs a flagman has, that it is impossible for one person to do them all. Quite so.

An ideal arrangement is to use two flagmen: one man keeps an eye on approaching traffic while the other pays strict attention to cars actually in, or leaving, the corner. This is where the trouble usually comes. One man can't effectively control traffic approaching, passing through, and leaving (the number of cars spinning 30 yards or so past the corner is considerable). But two people working together can handle the job well. The approach observer keeps the corner man alerted to oncoming traffic, and watches for mechanical troubles on the cars. The man watching developments in the corner and beyond also keeps tabs on re-entry.

The man watching approaching traffic serves another useful function. When someone comes roaring down on their position, he passes the word to his partner and they decamp.

I definitely like to have someone at my back* when I am looking in the direction opposite to traffic. At one race a friend working with me yelled and elbowed me violently in the back. We left, and about a milli-second later a Lotus went sideways over the spot we had been occupying. A small matter of a locking front brake, not serious, but disconcerting.

There is an even more vital reason for having two flagmen per corner. In the unfortunate event that somebody inverts his car and there is only one flagman, the situation becomes decidedly sticky. The flagman can't help, because this is the very time he must stay at his post. The comm man also has to stick to his job to keep information flowing to control. The driver is necessarily left to work out his own problems or, worse, left to the well meaning but dangerous help of spectators. If there are two flagmen, one can flag down cars and one can take needed action on the scene; the comm man can keep control informed. The extra flagman can aid the driver until qualified help arrives, he can keep people from dragging the driver out of the car and unintentionally compounding any injuries, or if the car is wrong side up he can direct righting operations. The main thing is that a man who knows the score is on the spot to take charge.

The red-hot duel between two cars is also a problem. This is what the spectator has come to see (unless he is one of Senator Neuberger's spectators), and is doubtless bully sport for the drivers concerned. The flagman, on the other hand, braces himself every time the duelists arrive at his corner. He is sure that somebody will go in too deep, tangle with a slower car, or find something original to do. In this case, too, the lookout man warns his partner of what's coming.

In addition to occasional fun and games with cars, the flagman's lot is not improved by his working conditions. Usually he is placed out on an airport runway on a sunny day, shade nil. He can't sprawl comfortably under an umbrella or in the shade of a car. One, he has to be on his feet ready to move in an instant. Two, he can't have anything solid cluttering up the area near the course. A flagman can stand not on the order of his going; and if he were to leave behind

*R&T Ed. note: An effective variation of the two-flagman method is practiced in California: the flagmen stand face to face, but at slightly different distances from the track so that they can see past one another. This gives each man instant knowledge of conditions behind him through his companion's signals and actions. If he has to leap to safety, he knows when and where to go. Pairs of flagmen are rotated around the track between the races, giving each a chance at the more interesting, and the more comfortable, corners.

chairs, cars, and the like, a driver could be seriously inconvenienced. So he cooks in his own juices for up to an hour and a half while staying on his feet.

The flagman himself doesn't mind too much being the forgotten man of sports-car racing, but this lack of recognition has had a more serious effect. Flagmen are scarce. Flag marshals toss and turn for nights before a race, wondering where they are going to get enough of them. The regulars, who show for almost every event and are experienced, are highly prized, but there is room for many more. If you're still interested in flagging, the flag marshal in your area will be glad to hear from you.

The author's experience has been acquired on Florida tracks, most of which are airport courses. The large number of war-surplus fields, together with Florida's climate, makes racing an all-year sport. This has allowed McNenny, at 22, to accumulate many hours of flagging time. He made his own start in flagging by volunteering at his first race. He and his wife, Babs, often work as a team. McNenny favors combined driver-and-flag schools for ideal track education, and has one great ambition—to flag at Sebring.

LETTER FROM THE CONTINENT

BY BERNARD CAHIER

THE SPORTING WORLD has been saddened by the death of Jean Behra (see "German Grand Prix," page 72) and of Ivor Bueb, twice winner of Le Mans.

A very personable figure, Bueb was a man who was at his best at the wheel of a sports car. His ride at Le Mans in 1955, when he helped the late Mike Hawthorn win in spite of all the havoc of the terrible accident, will long be remembered. So will his first-class drive to win at Le Mans in 1957, but he will be remembered best for his gaiety and his ever-perfect manners.

The two races held on the beautiful circuit of Clermont-Ferrand were excellent. The sports-car race was won by the amazing little Lola 1100, which not only defeated many bigger cars (including a Ferrari Monza!) but managed to force Behra to break a valve on his last lap when he was leading the race.

The Formula II race was dominated by the mastery of Stirling Moss, who fixed everybody nicely at the wheel of his Cooper-Borgward. It was Stirling's 4th straight victory with the Cooper-Borgward entered by the Walker Team. Second in the race was H. Taylor, and McLaren was 3rd.

Two weeks before, Moss had also won the F-II race at Rouen with the same Cooper-Borgward, and he had taken the sports-car race there with the new 2-liter Maserati.

A new Simca V-8 will appear shortly from France to replace the line of Vedettes which are still using that old Ford V-8 60 with side valves.



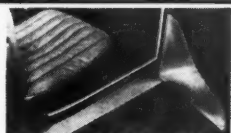
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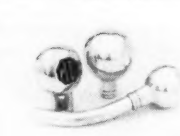
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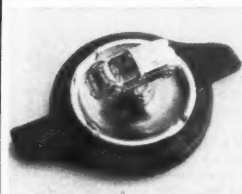
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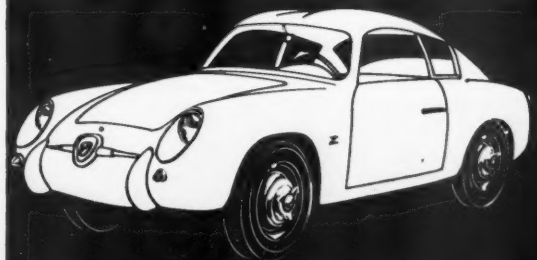


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MASERATI ROAD TEST

continued from page 39

holds steady to about 75 mph, then gradually falls off due to the powerful influence of air drag.

There was no opportunity to make even one all-out high-speed run. The manufacturer states that the car will reach 143 mph, but we think that figure is about as optimistic as the speedometer (10% high, an inexcusable error in a car of this caliber). The corrected figures obviously need no apologies. If we had plotted the acceleration data without regard to speedometer error, our curve would have tallied almost exactly with the curve published by the Maserati factory.

Students of performance data will note that the test weight is considerably higher than our usual curb-plus-300-lb figure, and they should be charitable enough not to ask questions regarding the weight of the people involved. The curb weight itself includes 23 gallons, or 138 lb, of fuel. (The three big Webers are gluttons if opened often and/or for long.)

Technically, the car's big feature is its all-aluminum engine. This is a magnificent piece of engineering, with a massive 7-bearing crankshaft and a very simple chain layout driving the 2 overhead camshafts. The engine looks open and easy to work with. A feature new to us is an iron cylinder sleeve which presses in like a dry liner, but has the upper circumference surrounded by water (in wet-sleeve fashion) for a distance of about 2 in. There is no head gasket at all, in the usual sense: the iron barrels project .005 in. and seat on the flat underside of the

aluminum head. A water seal is formed by a synthetic ring which slightly overfills a channel in the block, running all the way around it.

The single-plate clutch needs no clodding. It gave off a faint odor during one of the standing-start tests but continued to bite as well as ever.

It is a little surprising that Maserati buys its rear axles from Spicer in England; they are identical to those on several British cars. Several American cars use the same design, and it appears that Toledo-made parts will fit. Available axle ratios are 3.31, 3.54 standard, 3.78, 4.09, 4.27, 4.55 and 4.78:1.

Our test car had large-area drum brakes. They gave no indication of being overstressed, even after three stops from 100 mph in the space of 7 or 8 min. Maserati can supply English-made disc brakes. Disc wheels with perforations are supplied by Borrani, but wire wheels are not available: the hub and drum design requires a deep-dish effect which will not permit their use.

The buyer of a Maserati pays a lot for the privilege of ownership, but he gets a lot in return. He may get a few problems too, but each car is delivered with a complete shop manual—unfortunately all in Italian. For parts there is the Maserati Corporation of America in Glen Cove, N.Y. With Sr. Orsi's well known interest in the U.S. market for his cars, we can expect to see many more of these beautiful machines on our streets and highways.

LE PILT

continued from page 51

bar), led directly to the 4 expansion chambers residing above the pistons.

The quartz pistons, riding in marble cylinders, had individual tulipwood connecting rods with mortise and tenon joints leading to a single-throw crankshaft. Ejection of the steam into the lined cylinders gave rise to the term "very wet liner," of course. It also resulted in a single, gigantic downward thrust of the 4 pistons, producing one convulsive revolution of the crank. The theoretical operating life of the pistons was one stroke, but this was sufficient as Le Pilt was designed to be started, if possible, just once and then let run.

The fantastic torque delivered by the revolution of the massive crankshaft was thought sufficient to spin the Bessemer converter at 37,750 rpm. It thus assured actuation of the front wheels, according to the blueprints, through the Bunsen burners and a chain (illustrated).

There does not seem to be a great deal to say about the exhaust system, as it was a dummy. All the steam was intended to be used.

Illustrated exterior details of interest to the latter-day enthusiast include the rear lighting. Acetylene gas was used, of course, and the acetylene gas cooler may be observed just above the rear license plate. The coffee machine to the rear of the calliope reportedly never made very good coffee. The steering wheel was fully

adjustable: up, down, back, forth and off.

The solid balsa wood frame (for lightness) may be observed at the rear, as may the handle for giving the Bessemer converter a spin should it slow down due to friction. Note also the front steps, considered essential for all vehicles of the day, which led nowhere.

The ball and chain brake-actuating mechanism is clearly visible, and while it may be considered somewhat fragile for the job at hand in the light of present-day knowledge of weight, the brakes were themselves remarkable in that they were of true disc type. The discs, which may easily be seen, were holes in the brake drums. The firewall, armor plated for obvious reasons, was replete with interesting dials having painted needles.

The small tank above the radiator at the rear was in reality a distillation unit. The liquid distilled, it was contemplated, would be the national drink of the country whose king chose Le Pilt. The up man's control panel, with its finely executed gearshift gate, is believed to have been made of Flemish rosewood, heli-acted at the joints.

The vulture (or is it a Silesian Prynxx?) has never been fully explained.

Beyond this it is difficult to comment on Le Pilt. Its actual running performance, not to mention the means necessary to get it to run, are unknown because it never ran.

TECHNICAL CORRESPONDENCE

MG + Ford = Heat

Some time ago I purchased a 1952 MG with a stock Ford V-8 60 partially installed. On completion of the installation I find that I am unable to get it to run cool, even with the hood off. A stock MG radiator is being used and the engine has no thermostat.

Any suggestions that you might have for solving this cooling problem would be appreciated.

Reseda, Calif. J. P. Riley
The answer to your problem is quite simple: you are asking too much of the MG cooling system. In the first place, the Ford engine is nearly twice as big (in displacement) as the MG, and secondly, the old side-valve Ford V-8 has one of the world's worst heat-rejection rates. The very long exhaust ports leading from valves placed on the inside of the V to outlets on the outer sides give the escaping exhaust gases ample time to transfer their heat to the cooling water.

The solution is obvious: you have only to increase the capacity of the cooling system and your troubles will be over. In the June 1954 issue of R&T we ran an article on just such an engine swap as yours. One of the problems covered was the radiator. A honeycomb core measuring 16 x 17 in. and with a core thickness of 3.5 in. was fitted with 1937 Ford header tanks. This combination must be angled back slightly to fit, but it keeps the engine cool. One drawback is the filler cap, which isn't under the original MG filler opening.

A better solution might be to put a thicker core between the MG header tanks, which would require making new connections to match the Ford plumbing. In this manner you could keep everything looking original and still have a cool engine. Most of the larger shops specializing in radiator repairs have a variety of core material in stock and can make up a new radiator for a very moderate cost: probably not much more (and quite possibly less) than \$50.

Wear Index Again

I would like to have an explanation of the R&T wear index. I surmise that the higher the index number, the less durable the car would tend to be. Correct?

North Beach, Md. Ronald C. Paape
Correct. A high wear index figure does mean a less durable automobile in most cases. Our wear index is arrived at by multiplying the number of engine revolutions per mile by the piston travel, given in feet per mile. The answer will usually run out to seven digits, so we divide by 100,000 to make the final figure handier.

Obviously, the modern short-stroke engine coupled to a numerically low axle ratio will score a very low number for its wear index and will, in fact, have a low rate of wear. In specific cases, however, when years of development have refined an old long-stroke design, the old timer's service life may far exceed that predicted by our wear index.

Jaguar's Answer

I would like to pass on some information that may be of help to Jaguar owners having starting troubles in cold weather areas. I discussed this problem with the mechanic at one of our area Jaguar dealers, and he did not know how to cure it. He stated that they had received numerous complaints, but had been unable to correct the trouble.

I found out what to do by writing the factory and applying the fix to my first Jaguar and to my present 1956 XK-140 convertible.

The trouble in most cases is in the starting carburetor tube, which leads from the carburetor and fastens underneath the manifold. Inside the tube at this point there is a valve and spring, which I believe is called an anti-blow-back valve. In cold weather this valve is not actuated enough to allow sufficient gas to enter the manifold. It is a simple matter to remove this and throw it away and the starting trouble will be corrected, providing the engine is otherwise in good tune.

Lima, Ohio Earl L. Link
Thank you for this tip, which shows once again that most factories are more than willing to cooperate in solving owners' problems. Many Jaguar owners hook up the starting carburetor to a dash-mounted toggle switch so that they may control the choke themselves.

Ignition Wires

Can you tell me where to buy a high-quality set of ignition wires (possibly stainless steel) for a 1956 Corvette?
Conneaut, Ohio Sam Piller

The SAE handbook recommends tinned copper wire for all ignition wiring. Even so, for the high-tension leads connecting the distributor, coil and spark plugs, any conductor will do. The only advantage of stainless steel would be its resistance to corrosion and in that respect, the tinned copper would do as well. Any of the larger service stations can supply you with an abundance of tinned copper wiring, which is good anywhere in the car's electrical system. Actually, the best possible material would be silver, which has a value of 100 on the conductivity scale but is, obviously, too expensive.

The next best conductor, fortunately for the poor car buyer, is the relatively inexpensive copper we now use. Copper has a conductivity value of 97.67, which gives it an enormous advantage over steel (stainless or not), which has a value of 12.00. You could use stainless steel, but it would require over eight times the cross sectional area to equal the job done by copper.

These units of conductivity are based on resistance per unit of cross section, not weight, so the actual weight increase would be on the order of six times. Aluminum is sometimes used in very lightweight applications, where its lower conductivity (63.00) is compensated for by its very low specific gravity (2.56, against 8.82 for copper).

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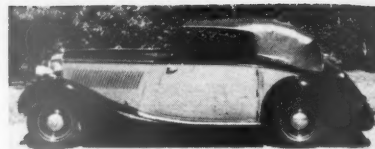
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